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From the Editor's Desk

At the recent World Orchid Conference held in Ecuador, it was announced that the Orchid Society of Western Australia was the Provisional Winner to host the 2023 World Orchid Conference is Perth! That's an outstanding achievement for a city (rightly or wrongly) regarded as the most remote on the planet. That remoteness adds to the charm and uniqueness of this part of south-western Australia. There is so much to see and do in this wonderful part of the world. The native orchids and range and diversity of indigenous wildflowers have to be experienced firsthand to be believed. In WA, they have a strong committee and large growing band of enthusiastic helpers to ensure this event will be a huge success, with all parties working together towards a common goal. They have a proud and strong record in Western Australia when it comes to conferences, having held many memorable and successful events. Congratulations!

In this issue we are pleased to publish the description of a completely new and distinct *Sarcochilus* species from south-east Queensland. Keeping with the *Sarcochilus* theme, Scott Barrie of Barrita Orchids discusses progress with breeding orange-flowered hybrids within this popular genus.

Eric Collins provides a plethora of orchid growing advice in his *36 Orchid Growing Tips*. Eric lives at Coffs Harbour, NSW and has been growing orchids for many decades. There are some wonderful common sense pieces of advice as well as a few that Eric has developed himself from trial and error. Reading such an article may save you from making those same initial mistakes.

Keith and Loma Oxley are master growers of Softcane Dendrobiums. In this issue they share their secrets to success, and how to get the best growth and flowering on your plants.

Continuing on the practical side of things we publish two different papers on *Orchid Ailments and Their Management*. These were the top two entries in the writing competition run and promoted by the *Australian Orchid Foundation*.

There are also a number of new terrestrial orchids that are formally named and officially described for the first time in this issue. This is very important with ongoing conservation initiatives.

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Australian Orchid Review
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Cover Shot

***Sarcochilus* Kulnura Mischief 'Dale'**

Grown and photographed by Randall Robertson, bred by Scott Barrie of Barrita Orchids, NSW. Read about new orange *Sarcochilus* hybrids in this issue.

Sarcochilus loganii young plant flowering *in situ* (WH)

Sarcochilus loganii

a New Species from the Wide Bay District of South-eastern Queensland

by David L. Jones & Mark A. Clements

Abstract

Sarcochilus loganii D.L.Jones & M.A.Clem., from the Wide Bay District of south-eastern Queensland, is described and illustrated. The new species is compared to the two other closely allied species, *Sarcochilus hillii* (F.Muell.) F.Muell. from Queensland and New South Wales and *Sarcochilus tricalliatus* (Rupp) Rupp from central and northern Queensland. The contention by Alan Logan that *Sarcochilus minutiflos* F.M.Bailey is a synonym of *Sarcochilus hillii* is upheld (Logan 2010). *Sarcochilus hillii* is lectotypified.

Key Words

Orchidaceae, *Sarcochilus loganii*, *Sarcochilus hillii*, *Sarcochilus minutiflos*, *Sarcochilus tricalliatus*, new species, lectotypification, K, MEL, W, Queensland, New South Wales, Australian flora.

Introduction

Alan Logan, an enthusiastic orchidologist with several important finds to his credit, reported the discovery of an apparent new species of *Sarcochilus* from the Mount Walsh National Park in the Wide Bay District of south-eastern Queensland (Logan 2005), and also discussed in some detail the apparent relationships of the new species with allied taxa (*Sarcochilus hillii* (F.Muell.) F.Muell. and *Sarcochilus tricalliatus* (Rupp) Rupp). He also questioned the status of *Sarcochilus minutiflos*, a poorly known species named by the Queensland colonial government botanist Frederick Manson Bailey in 1913 in the *Comprehensive Catalogue of Queensland Plants*. Bailey based his description of the taxon on specimens collected from Eidsvold in the nearby Burnett District by botanist Dr. Thomas Lane Bancroft. The description was supported by a line drawing depicted by Cyril Thomas White, Bailey's grandson. The drawing shows strong similarities with *Sarcochilus hillii*, particularly figure E which is a depiction of the labellum of *Sarcochilus minutiflos* and shows a large hairy midlobe. Neither the new species described below, nor *Sarcochilus tricalliatus* have such a labellum midlobe. After more follow-up research, Logan (2010) concludes that *Sarcochilus minutiflos* should be treated as a synonym of *Sarcochilus hillii*, a status with which we agree having studied the type collection which is at Kew.

Earlier, Clements (1989) in the *Catalogue of Australian Orchidaceae* recorded a specimen of *Sarcochilus hillii* (basionym *Dendrobium hillii* F.Muell.) at Kew (K) as the holotype for this species, having at that time been unable to locate material of this same collection at the Melbourne Herbarium (MEL), where most other collections of Baron Ferdinand von Mueller are housed. Subsequent investigations confirmed the presence of two sheets of *Sarcochilus hillii* in MEL both listed as syntypes. To one these sheets was attached an original label in von Mueller's hand with descriptive notes under the heading of *Dendrobium hillii* which had subsequently been crossed out to read *Sarcochilus hillii*. The second sheet is simply labeled *"Sarcochilus hillii Ferd. von Mueller, Moreton Bay"* in Mueller's hand. A re-examination of the type material at K, MEL and Vienna (W) reveals that these collections are comprised of not one, but two species with representative specimens of both *Sarcochilus hillii* and *Sarcochilus eriochilus* Fitzg. Furthermore both collections in MEL are of *Sarcochilus eriochilus*, K has both *Sarcochilus hillii* and *Sarcochilus eriochilus* and W has two specimens of *Sarcochilus hillii*. Von Mueller's protologue is brief and could be equally applied to both species with the exception of the collection details *"branches of trees around coastal bays of Moreton Bay"* which fits with epiphytic *Sarcochilus hillii* as we know it today, but definitely not the lithophytic *Sarcochilus eriochilus*. The best specimen that entirely matches the taxon described in the protologue and clearly being attached to a twig branch, is at Kew. In order to preserve the current application of the name *S. hillii*, the left hand side specimen at Kew above the label *"Sarcochilus hillii*, Moreton Bay, Hill, Herb. F. Mueller, 1873" is here designated as the lectotype. The material at W, where stored under the nomenclatural synonym *Thrixspermum hillii* (F.Muell.) Rchb.f., is here designated as an isolectotype.

Further research has failed to find any prior description of the species discovered by Logan. The new species is described below, illustrated with a line drawing and photos and compared in detail with *Sarcochilus hillii* and *Sarcochilus tricalliatus*.

Taxonomy

1. *Sarcochilus hillii* (F.Muell.) F.Muell., Fragm. 2: 94 (1860). Basionym: *Dendrobium hillii* F.Muell., Fragm. 1: 88 (1859); *Thrixspermum hillii* (F.Muell.) Rchb.f., Beitr. Syst. Pflanzenk. 71 (1871). Type: In ramis arborum ad sinum litoreum Moreton Bay, *W.Hill s.n.* (lectotype K!, LHS specimen, top right of sheet, here designated; isolectotype W!, RHS specimen, here designated).

2. *Sarcochilus loganii* D.L.Jones & M.A.Clem. ***sp. nov.*** With affinity to *Sarcochilus hillii* (F.Muell.) F.Muell. but differing by the bases of the lateral sepals and petals with a distinct lateral gap when viewed from the front (no lateral gap in *S. hillii*) , more or less oblong lateral sepals and petals (obovate in *S. hillii*), labellum with an obscure broad blunt spur (prominent deep narrow spur in *S.hillii*), the lateral lobes and short midlobe fused completely, the midlobe not protruding at all (midlobe mostly free of the lateral lobes in *S. hillii* and projecting forwards from them), the anterior surface of the midlobe covered with short bristly non-glandular hairs (glandular hairs in *S. hillii*) and a single domed median callus towards the base (bright yellow calli appearing as 4 distinct structures in *S. hillii*, the central one deeply lobed and double-headed, with smaller flanking calli); also with *Sarcochilus tricalliatus* (Rupp) Rupp but differing by the bases of lateral sepals and petals with a distinct lateral gap when viewed from the front (no lateral gap in *S. tricalliatus*), more or less oblong lateral sepals and petals (ovate to obovate in *S. tricalliatus*), labellum with a solid spur (thick-walled hollow spur in *S. tricalliatus*), the lateral lobes and midlobe fused completely, the midlobe not protruding at all and covered with short non-glandular hairs (short free midlobe just projecting forwards from the lateral lobes and covered with very short glandular hairs in *S. tricalliatus*), the callus consisting of a single domed basal structure (large central deeply lobed structure with two much smaller side calli in *S. tricalliatus*).

Type: Queensland. Wide Bay District; Mount Walsh National Park, 22 Aug. 2006, *A.E.Logan* (ORG 5221) (holo CANB 738094).

Illustration: page 56, top plate, bottom plate (RHS image), *Orchadian* 15(1) 2005 – as *Sarcochilus* species, Wide Bay region.

Description: Small epiphyte usually consisting of a single growth with spreading to drooping leaves. *Stem* unbranched, 10-30 mm long. *Leaves* 2-8, linear, canaliculate, 50-120 mm long, 3-4 mm wide, arching to drooping, fleshy, dark green, apex acuminate. *Racemes* filiform, 30-80 mm long, shallowly flexuose, 2-8-flowered, flowers opening sequentially. *Pedicels* filiform, c. 3-4 mm long, merging with the ovary. *Flowers* 6.5-7.5 mm long, 6.5-8 mm across, white, lightly scented. *Sepals* and petals incurved to spreading, broadest near the middle, a significant gap between the petals and lateral sepals. *Dorsal sepal* obliquely erect, ovate, 4.7-5 mm long, 2.5-2.8 mm wide, apex obtuse. *Lateral sepals* widely divergent, oblong to oblong-obovate, 4.7-5 mm long, 2.5-2.7 mm across, apex obtuse. *Petals* incurved to spreading, oblong-linear to oblong-falcate, 4.7-5 x 1.8-2 mm, apex broadly obtuse. *Labellum* c. 2 mm long, c. 2.5 mm wide (c. 4 mm wide when flattened), c. 3 mm deep, cream to pale yellow with dark pink markings; lateral lobes erect and incurved, more or less triangular, c. 2 mm long, c. 1.5 mm wide, glabrous, inner surface with dark pink-purple markings and stripes; spur (chin) broad, blunt, obscure, with a shallow sunken area on either side of the callus; midlobe thick, fleshy, fused completely with the lateral lobes and not protruding forward of them, the anterior surface covered with short hispid non-glandular trichomes. *Central callus* domed, glabrous, about as wide as long, posterior surface rounded, anterior surface shallowly emarginate. *Column* c. 2.5 mm long, with a foot c. 1.5 mm long incurved more or less at right angles to the body of the column. *Anther* more or less triangular, c. 1.2 mm long, c. 1.3 mm long, with a porrect to upcurved rostrum. *Pollinarium* c. 1.3 mm long; pollinia ovate, c. 0.5 mm long, orange, waxy; stipe c. 0.4 mm long; retinaculum c. 0.4 mm long. *Stigma* transversely elliptic, c. 1 mm across. *Capsules* not seen. **Fig. 1.**

Flowering: August and September.

Sarcochilus loganii **mature plant flowering *in situ* (WH)**

Sarcochilus loganii (WH)

Australian Orchid Review

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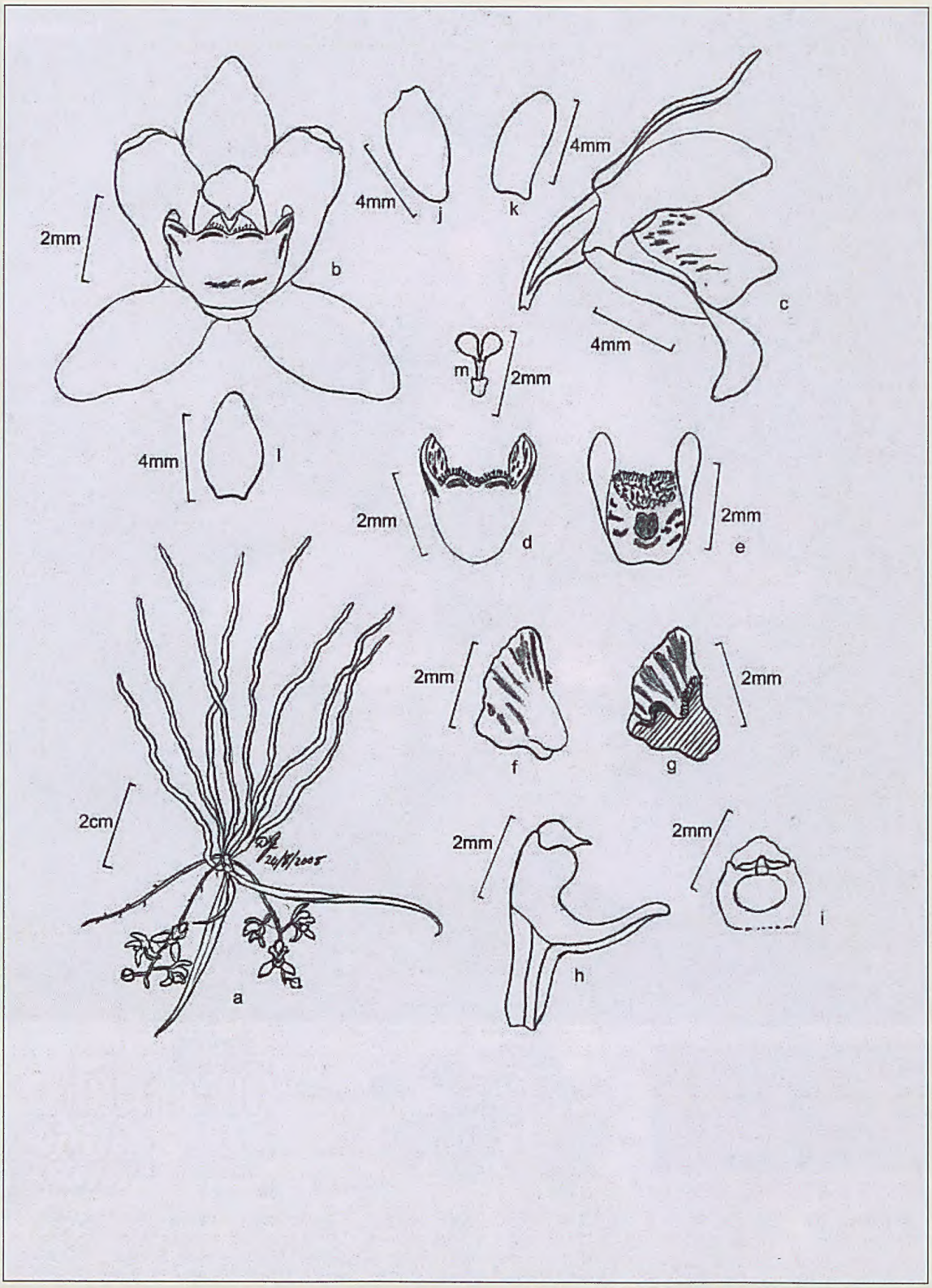

Sarcochilus loganii*, Mount Walsh National Park, Queensland, *A. Logan (ORG 5221) **(Fig. 1.)**
a. flowering plant; b. flower from front; c. flower from side; d. labellum from front; e. labellum from rear; f. labellum from side; g. longitudinal section of labellum; h. column from side; i. top of column from front; j.lateral sepal; k.petal; l.dorsal sepal.

Sarcochilus loganii
(WH)

Sarcochilus loganii
(WH)

Sarcochilus loganii (MAC)

Sarcochilus loganii (MAC)

Distribution and ecology: Queensland, where apparently restricted to the Mount Walsh National Park in the Wide Bay District of the south-east. It grows as a twig epiphyte on rainforest trees. 500-700 m alt.

Recognition: Small epiphyte consisting of a single growth with 2-8 spreading to drooping narrow channelled leaves, thread-like shallowly flexuose racemes bearing sequentially opening small white flowers (6.5-7.5 mm long, 6.5-8 mm wide) with more or less oblong lateral sepals and petals, a wide lateral gap between the bases of the lateral sepals and petals, labellum with an obscure broad blunt solid (not hollow) spur, the lateral lobes and short midlobe fused completely, the midlobe not protruding at all, the anterior surface covered with short bristly non-glandular hairs and a single domed median callus towards the base.

Similar species: Confused with both *Sarcochilus hillii* (F.Muell) F.Muell. and *Sarcochilus tricalliatus* (Rupp) Rupp. *Sarcochilus hillii* can be distinguished by its white to pink flowers (8-10 x 8-10 mm) with abutting or imbricate lateral sepals and petals (no lateral gap), obovate lateral sepals and petals, labellum with a prominent narrow, deep, solid (not hollow) spur, the midlobe (c. 2 mm long) mostly free of the lateral lobes and projecting forwards from them, densely covered with glandular hairs, the bright yellow calli appearing as 4 distinct structures, but the central one deeply lobed and double-headed, with smaller flanking calli.

Sarcochilus hillii - Barrington Tops, NSW (DPB)

Sarcochilus hillii* forma *albus* - Mount Binga, Queensland *(JR)

Sarcochilus tricalliatus can be distinguished by its white flowers (8-10 x 8-10 mm) with abutting or imbricate lateral sepals and petals (no lateral gap), ovate to obovate lateral sepals and petals, and labellum with a narrow, thick-walled hollow spur, the short midlobe (c. 1 mm long) free and only just projecting forwards from the lateral lobes, covered with very short glandular hairs, the callus consisting of a large central deeply lobed structure with two much smaller side calli.

Notes: Only a few flowers are open at once, others opening as the raceme extends, producing flowers sporadically over a short period.

Conservation: Known from several sites in the Mount Walsh National Park in the Wide Bay District and conserved; should also be searched for in parts of the adjacent Burnett District; suggest 2KC by the criteria of Briggs & Leigh (1996).

Etymology: Named after Alan Edward Logan (1930-), farmer and keen naturalist with a special interest in orchids who discovered this species and researched its relationships with related species.

Acknowledgements

Thanks to Alan Logan for bringing this species to our attention and supplying specimens legally collected with a permit, Jean Egan for preparing David Jones's drawing for publication, Wayne Harris, Michael Harrison, David Banks & John Roberts for photographs and Brendan Lepschi for discussions on taxonomic protocols. Special thanks to David Banks for commenting on earlier versions of the manuscript and sharing his expert knowledge of *Sarcochilus*.

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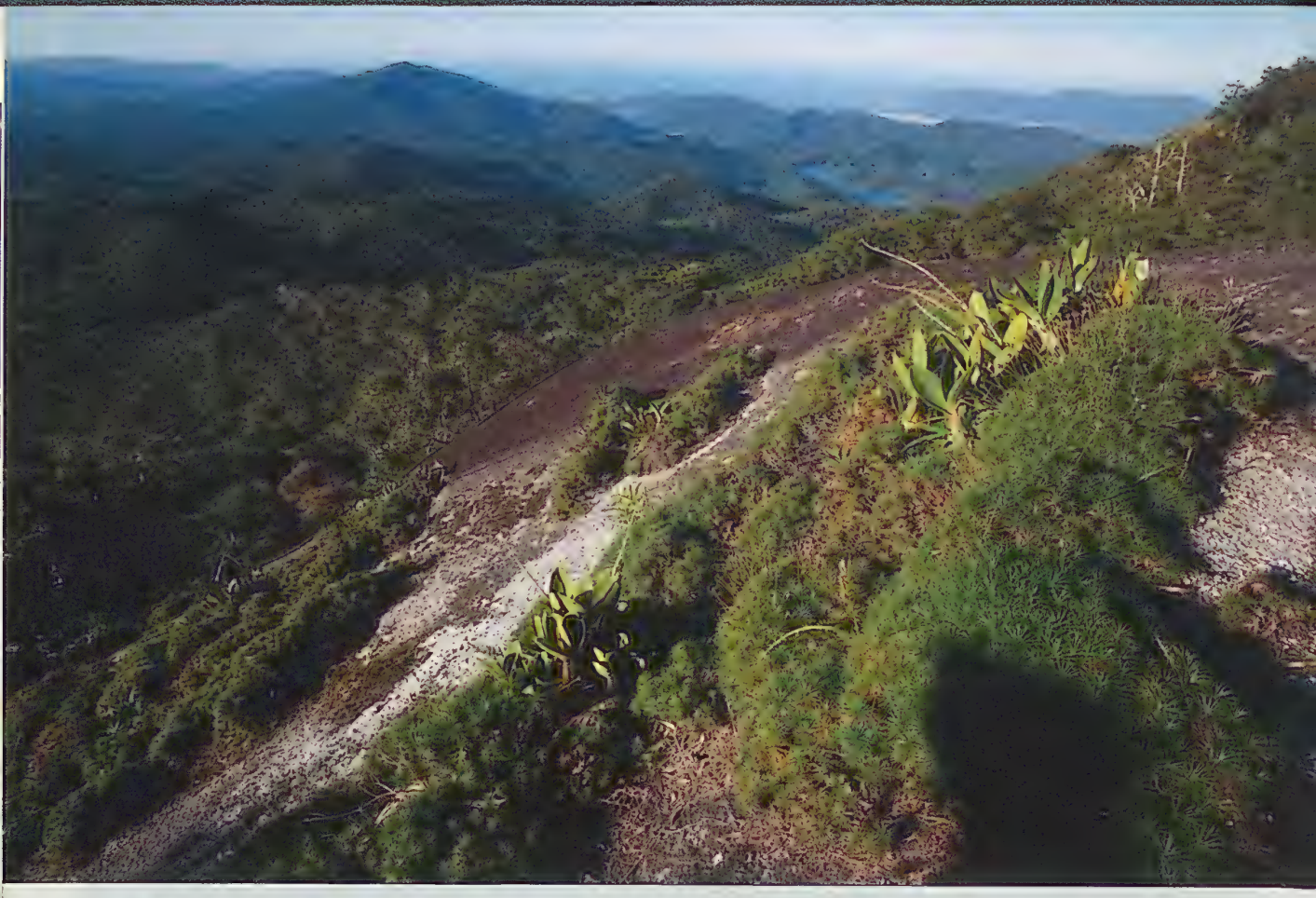
Sarcochilus tricalliatus **- Eungella, Queensland *(MH)***



Wet Tropics a critical refuge for Australia's Rock Orchid

The Wet Tropics may become the last place in Queensland to see a native Rock Orchid (*Dendrobium speciosum*) growing in the wild, according to James Cook University research.

The genetic study of Australian Rock Orchids by PhD candidate Lalita Simpson was co-authored with her supervisors, Darren Crayn and Katharina Nargar at the Australian Tropical Herbarium, and Mark Clements at the Australian National Herbarium and has been published in the journal *Molecular Phylogenetics and Evolution*.

Ms Simpson said evidence from the genetic analysis had shown the orchid *Dendrobium speciosum*, which only occurs in Australia and previously had been thought to consist of up to 11 species, was in fact a single species with two subspecies, one northern and one southern.

"The study reconstructed the distribution of the Rock Orchid under past climatic conditions, which showed a large barrier of unsuitable habitat between Rockhampton and Mackay separated the northern and southern populations in the past," she said.

"This prevented the exchange of pollen and seeds and as a result two subspecies have evolved.

"We modelled the distribution of the Rock Orchid under different climate scenarios predicted for the future and found the northern subspecies which grows between Cooktown and Mackay will be the most severely impacted by climate change.

"With average global temperatures warming beyond a two degree increase we found that by 2080, those wanting to see the Rock Orchid's spectacular flowers in Queensland's bush would only be able to do so in the Wet Tropics.

"However, if warming was contained below a two degree increase, suitable habitat would be maintained in several regions along Queensland's east coast.

"The southern subspecies, which occurs between Rockhampton and the New South Wales and Victorian border, is not as greatly affected as its relatives in the north, although lowland populations along the coast are also threatened."

Australian Tropical Herbarium Director Professor Darren Crayn said the study showed how important climate change

was for the evolution of biodiversity, both creating and extinguishing it.

"Ancient climate change drove the evolution of the two subspecies of Rock Orchids from their common ancestor, and now it looks like future climate change will reduce one of them to a small fraction of its current distribution," he said.

Dr Mark Clements said samples were collected from across the entire species range along the east coast of Australia and took more than 30 years to accumulate.

"The results resolve recent controversies regarding the best classification for this grand orchid which is one of Australia's truly iconic and recognisable indigenous orchids."

The Australian Tropical Herbarium is a joint venture between CSIRO, Australian and Queensland Governments and James Cook University. The Australian National Herbarium is part of the Centre for Australian National Biodiversity Research, a joint venture between Parks Australia's Australian National Botanic Gardens and CSIRO. ■

Lalita Simpson
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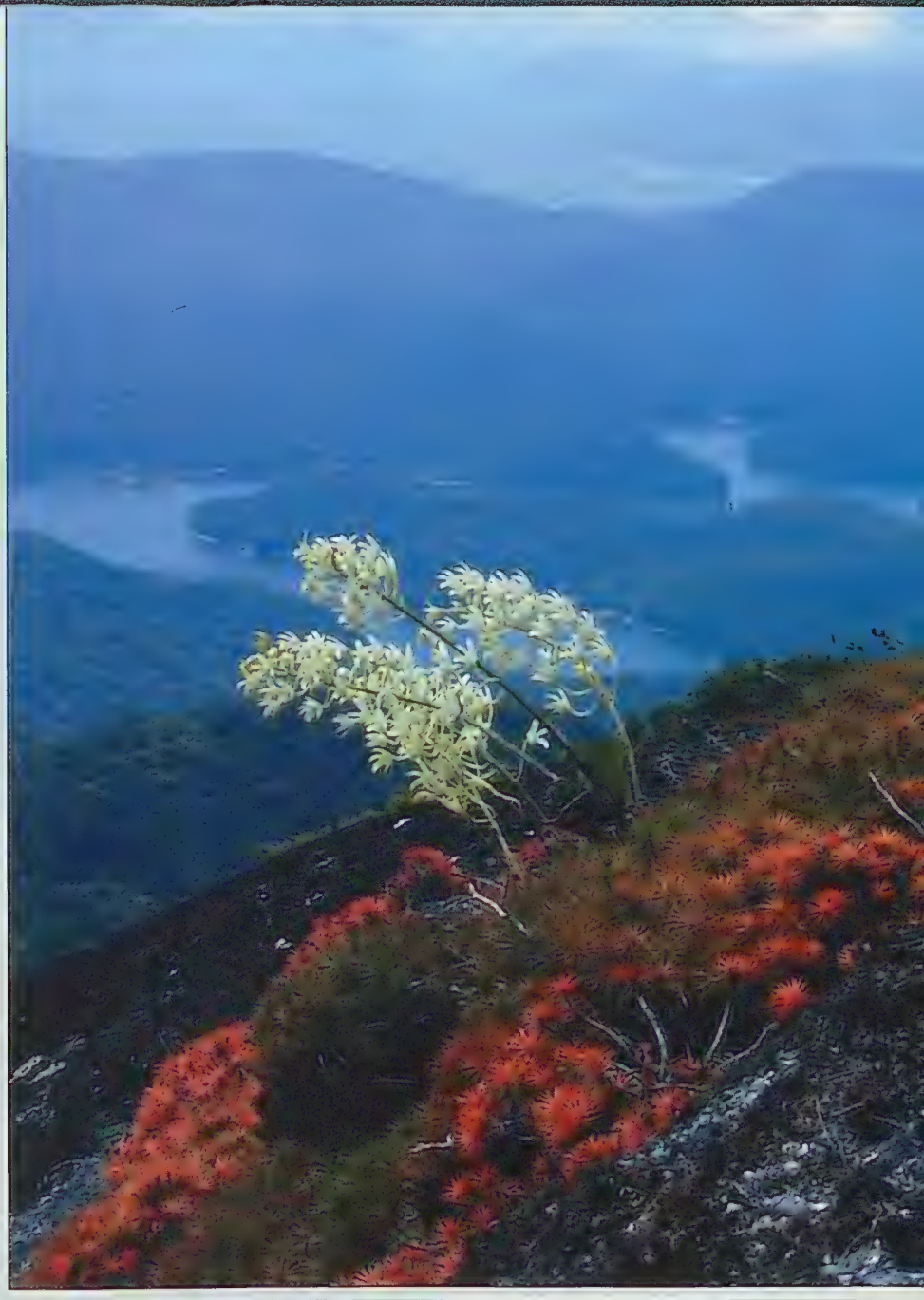

Floral Art
– by Gloria Cushway

Orchids at St Ives Orchid Fair 2017

Text and photos by David Banks

The St Ives Orchid Fair is an annual event held at St Ives Showground that consistently delivers with high quality orchids on display plus a strong and diverse sales area. It is the combined effort of four local orchid societies; being North Shore, Ku-Ring-Gai, Manly-Warringah and ANOS Warringah Group. The tireless Garrie Bromley has been Show Marshall since inception, and keeps everyone on their toes. Plus they are blessed with a hard working committee.

Every year there are outstanding orchids on display, with many of these awarded by the OSNSW judging panel. Over the past few years, one of the main features, apart from the Society island displays, has been the highly colourful (and fragrant) display of Australian *Dendrobium* hybrids by Master Grower Henk van den Berg. The variety, floriferousness, quality and plantsmanship in getting the best out of these orchids is breathtaking. It's worth visiting just to see Henk's display!

Now I must admit, I don't get too excited about Floral Art most of the time. But there was (to my mind) an outstanding arrangement made by the hard working Gloria Cushway. It featured *Rlc.* Malworth 'Orchidglade' as a centrepiece, circled with orange crucifix orchids (*Epidendrum*) and baby's breath. It gained second prize, such was the competition, but for me it was "Best in Show"!

Here is a snapshot of some of the eye-catching indigenous *Dendrobium* hybrids exhibited.

David Banks
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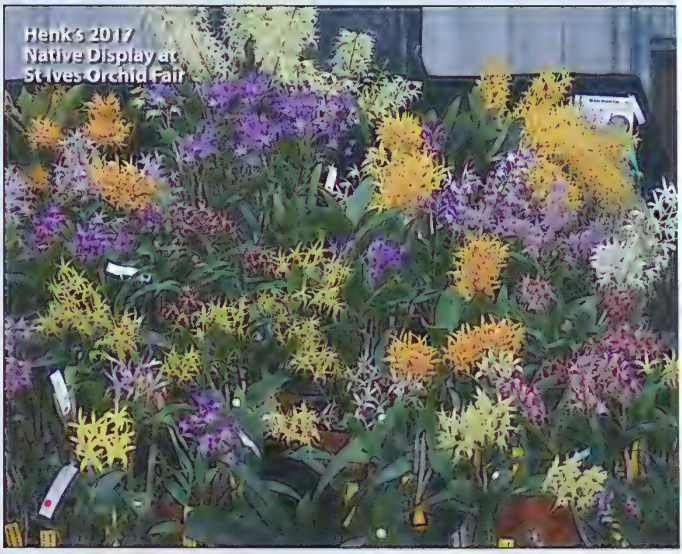
Henk van den Berg with his 2017 display

Dendrobium
Cosmic Gold
'Sandy'
FCC/AOC



Henk's 2017
Native Display at
St Ives Orchid Fair

Dendrobium
Peninsula Sands
'Lloyd'

Dendrobium
Warrior

Dendrobium
Awespot
'Ang'
AM/AOC

Dendrobium Binh Ba 'Exotic' AM/AOC, with its unique colour combination

Dendrobium Brimbank Gold

Orchid Ailments and Their Management

by Jan Robinson

The majority of the health problems we have are caused by one thing and one thing only--That Woman. "We" are a small collection of orchids doing our best to survive in a suburb of Sydney, but we are constantly under threat by the actions of That Woman. What have we done to deserve this? Some of us come from the tropical jungles of the Americas, or the cool rainforests of Asia, or, at the very least, the prime conditions of commercial orchid nurseries. To our horror, we have been plucked out of these wonderful environments and somehow ended up here with That Woman, fearing for our survival on a daily basis. Here are some examples of the numerous maladies that we have had to endure due to the irrational, illogical, insensitive and uninformed actions of That Woman.

MALNUTRITION

Initially when That Woman first became interested in orchids, she had no clue about feeding us. Water and the odd bit of foliar feed once in awhile was all we got. Please note that when there are hardly any new growths on your orchids, or the new growths are smaller than the old growths, then your orchids are starving and you need to do something about it!! Luckily That Woman attended a New Grower's class and learned about the benefits of fertilisers---but then the pendulum swung to the other extreme!

OBESITY

For a while, That Woman fed us with a hand sprayer, one of those pump up ones. She had heard the phrase "weekly weakly" in the New Grower's class and tried to follow that rule with her hand sprayer. We were much happier, much less hungry, and our growth habits were much improved. But then That Woman's hubby rigged up a bulk spraying system, one where she could mix up 100 litres of fertiliser at a time and totally saturate us, which she did with great enthusiasm and appalling regularity. No thought was given to the fact that we are a varied collection of orchids, ranging from large specimen-size plants to tiny seedlings just out of flask, or that we have different feeding requirements. Nor was there any consideration given to the impact of complete "saturation" of our potting media with fertilisers versus the previous light spraying technique. It was only when symptoms of obesity such as horribly swollen pseudobulbs, new leaves not unfurling properly because they were too fat, and mutated labellums began to appear that That Woman realised we had a problem with excessive food intake. Please don't overfeed your orchids!! In the wild, we rely on slowly decaying organic matter for our nutrition--don't try to supersize us with commercial products. Forget about trying to "hurry us along" to flowering size by feeding us too often. Think carefully about your fertilising regime and the possible consequences of what you are doing, particularly before making any major changes. Trust me; it takes a long time to recover from the effects of obesity.

DEHYDRATION

Lack of water at our location is caused by one thing -- That Woman being too lazy or "busy" to turn the watering system on frequently enough when it hasn't rained for awhile. If your orchids have a good root system and the "drought" doesn't last too long, they will usually spring back to life after a few good drinks. However, if your orchids are totally dehydrated because they have no roots and cannot absorb any water or nutrition, then you have a real problem. Shrivelled pseudobulbs can be a symptom of root ailments. There is only one way to tell for sure--take your orchid out of the pot and have a look at its root system. If there are only old dried up roots and no new healthy ones, then some first aid is required! That Woman is having some success with sphagnum moss as a remedy for this, especially for genera such as Oncidiums, Coelogynes, Lycastes and Anguloas. Cut off all the old dead roots and firmly pack the shrivelled pseudobulb and any live roots with sphagnum moss in a pot barely big enough to hold the bulb. Be patient, it takes time to recuperate from severe dehydration, sometimes years! When you see the pseudobulbs start to fatten up and a new growth develops, you have succeeded in treating your plant for dehydration.

ROOT ROT

The other extreme from being dehydrated is getting so much water that the potting mix stays too wet and the roots of your orchids rot. Root rot is bad news and the mortality rate is very high for plants that succumb to this ailment. That Woman is an expert at causing root rot, especially in her glass house. When her columnar oscillating fan stopped working, she foolishly replaced it with just a small fan that only blew air in one direction. Without considering the effect that this change of air flow might have on us, That Woman also decided not to repot any of her Paphiopedilums (slipper orchids) that live in the glasshouse that same spring and left us all in a mix of over 50% cocochip. How stupid was that?!! If the amount of your air flow changes for any reason, think about the impact on your orchids and make adjustments accordingly. Don't wait until your plants start to die to make a change. Treatment for root rot includes repotting your plant in fresh mix after cutting off all the rotted roots, giving it a good dose of Seasol or Auxinone, reducing watering for several weeks, and crossing your fingers that your plant pulls through this crisis. Repot your orchids on a regular basis, don't wait until your potting mix has broken down to a gluggy mess and rotted all the roots of your plants to take some action. Yes, it is a big job to repot your entire collection every few years. Yes, it may cost you a few dollars to buy new potting mix. Yes, it is a pain to wash and sterilise your old pots before reusing them by soaking them in bleach. But we're worth all the work and expense and we will reward you with fantastic flowers if you treat us right.

CROWN ROT

Not only has That Woman been known to rot our feet, she has also rotted some of our heads! Crown rot happens when water stands too long in the top of your orchid before evaporating or being absorbed. If this happens during the summer, the water may heat up and literally cook the top of your plant. If it happens during the winter, your plants won't be happy, either. At least this orchid ailment is a bit easier to spot than root rot, as you don't have to take the plant out of its pot to see what the problem is. Brown soggy leaves around the top of your plant are symptomatic of crown rot. If you're lucky, your plant will recover and put out a new growth. More than likely though, your plant is a dead duck. Crown rot, or "damping off," is also deadly for developing buds. If water stands in the crown of your Paphiopedilums where the buds are forming, they will go black and not mature - and you will have to wait another whole year for the chance of getting a flower. Some growers apparently use hydrogen peroxide to treat crown rot. Don't tell That Woman, we don't want to have all our heads drenched in that mixture!! Check your orchids a few hours after watering them. If water is standing in the top of a plant, drain it by tilting the plant on its side until the water runs off. Or soak up the water by dabbing it with a piece of paper towel. Sometimes That Woman puts a few stones between a pot and the tray it is standing in so that the pot sits at an angle and water can drain naturally out of the top of the plant. Sometimes you have to think outside the square to solve an orchid problem.

SUNBURN

Now this is a good one! What person in their right mind decides to move several trays of *Cattleya* seedlings from their usual spot of nicely filtered light into an area of much brighter sunlight - the day before temperatures are tipped to reach the high 40's? THAT WOMAN, of course! For once, the weather forecast was right and for the three days that temperatures hovered around 47.5 degrees, That Woman sat in front of a fan inside the house drinking cold drinks without even a thought about her poor *Cattleya* seedlings. Didn't she get a severe shock when she saw those seedlings, hardly recognisable and covered in third degree burns! Their lovely fat green leaves had turned pitch black. Several days later, the black leaves fell off the plants, revealing burned black pseudobulbs as well. What is the treatment for sun burn? Move your plant into a shadier spot, give it a big drink, and hope for the best. But beware; leaves with sunburn spots can become susceptible to fungal infections and other nasty ailments. So if the leaves of your burned plant don't actually fall off, try cutting off the damaged bit (with sterilised secateurs of course). And next time, pay attention to the weather forecast and move your plants **out** of the sun on hot days, not **in**to the sun! Wet the floor under your benches and move plants that normally hang up high in your bush house to down lower. Even orchids that are used to growing in the direct sun (*Dendrobium fimbriatum* and some Cymbidiums here at our place) can get sunburned in days of extreme heat. It only takes a few minutes to move your plants into a temporary shadier spot---it may take years for them to recover if you don't, if they recover at all.

HYPOTHERMIA

This is another orchid ailment that is directly attributable to That Woman. We get hypothermia when we are simultaneously too cold and too wet. This is easily preventable by (1) providing us with cover (maybe even a bit of heat) during the winter, and (2) being careful how you water us during cold periods. Only water on a sunny day; water before midday so our leaves have time to dry off before the sun goes down; and don't water us too frequently. Make sure there is good air circulation around us to dry off our foliage after watering. Remember, many of us require dry winters to initiate flower spikes in the spring. Most of us orchids have a much better chance of surviving in winter if we are cold and dry rather than cold and wet. Symptoms of mild hypothermia include leaf spotting and plant rot. Mild hypothermia may cause your orchids to be susceptible to fungal attacks. Severe hypothermia causes death. Spray with a fungicide if you must, but it's much better to just keep us dry during cold periods.

ALCOHOLISM AND BUG INFESTATIONS

That Woman hates insects. One of her favourite evening activities is to creep around the bush houses with a torch, hoping to find some unsuspecting grasshopper or slug to squish with great gusto. She does not like to spray with insecticides as a preventative method, she waits until she sees actual damage before taking any action. Somewhere That Woman read that methylated spirits is a good remedy for all types of scale on orchids, especially since its use is non carcinogenic to the grower, and it supposedly kills scale on contact. In typical unthinking style, That Woman got an old toothbrush, dipped it in some straight mentholated spirits, and launched into a vigorous scale eradication program. The mature Cattleyas didn't mind too much, as removal of all the old bracts around the pseudobulbs with the toothbrush revealed quite a few hidden nasties that were sucking the life out of the plants. When no more scale was visible, That Woman then gave the Cattleyas a thorough rinse with clean water. After waiting all of 24 hours and seeing no ill effects on these few trial plants, That Woman then proceeded to give the metho treatment to any and all of the rest of us that had even one spot of scale. In her tooth brushing enthusiasm, That Woman slackened off with the rinsing procedure after applying the straight metho - and guess what happened? Yes, she burned the soft leaves of young Cymbidiums, Oncidiums and Lycastes. They literally turned brown in a few hours after receiving the metho treatment. The treatment was worse than the original ailment!! Please think about the possible impact of any new procedures/chemicals/insecticides before adopting them for your entire collection, and wait at least several weeks if not several months to see what the effect has been before deciding to apply it to all your orchids.

INFECTIONS

That Woman is a master at encouraging infections, especially fungal ones. The worst example of fungal contamination happened last summer when That Woman overwatered all her *Sarcochilus* collection during a bout of hot, humid days. She did not realise she had a problem until leaves started falling off her sarcs by the handfuls.

That Woman found out later she had caused a catastrophic case of the dreaded fusarium fungus! This horrible malady invades our roots first, causing severe rot before destroying stems, leaves, and everything else in its path. CPR is immediately required if your plants become infected with the fusarium fungus: **C**arefully take the plant out of its potting medium ("carefully" because you don't want to damage what few roots there may be left); **P**rune the rotted roots, leaving only the healthy ones; and **R**inse all the old potting mix off your plant. Then soak it in a bit of anti-fungal solution such as Mancozeb before repotting in fresh mix. Give your plant a drink of Seasol or Auxinone to stimulate new root growth, and once again hope for the best. There are many other varieties of fungal infections besides fusarium that are detrimental to your orchid collection. Glomerella is a common one that creates horrible brown and black lesions on orchid leaves. Botrytis is another one; it attacks the actual flowers of your plants. Once again, this is a case of an ounce of prevention is worth a pound of cure. Don't overwater your orchids, especially when the natural humidity is already high. Proper air movement is critical to keeping fungal infections at bay. If something is preventing good ventilation, like the neighbour's new garage blocking off one side of your bush house, invest in a cheap fan or two. Never be tempted to buy plants that do not look healthy, no matter how cheap their price may be! Bringing new fungal-infected orchids into your collection is a recipe for disaster. Keep dead leaves and pseudobulbs trimmed off your orchids; they are great places for fungal diseases to incubate.

The 'V' word

The 'V' word throws That Woman into an absolute panic attack. She has no quarantine area and believes in immediate euthanasia of any orchid that shows even the slightest sign of unusual ring spotting on the leaves. Goodness knows how many perfectly good orchids That Woman has sealed in a plastic bag and dumped unceremoniously into the rubbish bin, fearing they were infected with a virus. (She would never put a sus plant into the green waste bin, in case the bin contents get mulched and distributed and thereby transmitting the virus to other plants and gardens.) She has never sent a leaf to a lab for a proper scientific diagnosis. "If in doubt, throw it out" is her motto. That Woman is a stickler for soaking her secateurs in bleach after every use, and she never ever reuses any potting mix. One reason she hates insects in her collection so much is because they have been known to transmit viruses. Over-the-top behaviour? Perhaps. But at least we haven't been wiped out by any virus like so many other orchid collections over the years.

That Woman, what a menace. Luckily she is going on holidays soon so we can have some well-deserved respite. We hope you never make any of these same mistakes with your own orchids. If you do, at least don't publicly admit it - to do so can be very embarrassing.

(This paper was the 1st Prize Winner in the *Australian Orchid Foundation* Essay Competition for 2017)

Breeding Orange *Sarcochilus*

Text by Scott Barrie, Barrita Orchids,
images by Randall Robertson

The New South Wales "Sarc" season has come to an end, and what an exciting flowering it has been. I made my first *Sarcochilus* hybrid in 1990, at that time we only had whites in our collection. Our focus was on producing upright spiked plants for the pot plant market. The resulting seedlings proved popular sellers and our program continued. Now, 27 years later, we are consolidating over twenty different colour variance sections. This is quite remarkable given that most of our hybrids are basically "*S.* Fitzhart". Interest has grown both domestically and internationally, and has seen plants from our breeding being shown around the world.

This flowering season we saw the consolidation of the orange section. One of the key areas of focus in our breeding program is the predictability of results. In the December 2013 - January 2014 *Australian Orchid Review*, I discussed the emergence of the orange section and the possibilities for future development of this section.

From that flowering in the spring of 2013 I made the cross of *S.* Kulnura Taser (Kulnura Need 'Shadow' x Kulnura Kaleidoscope 'Vig & Underlay'). As both parents show the orange colouration, I predicted that in this cross we would see even expression of the orange throughout the seedlings. The results were as expected as shown in the three photos of this grex accompanying this article. True orange is now a regular part of our program.

When we unveil new colours to the enthusiasts at our annual *Sarcochilus* Open Day, it is gratifying to see so many take up the opportunity to add these new colours in their collection. We will see many more of this type available at next year's "Sarc Day" on Sunday 21st October 2018. We will again feature lectures from prominent Australian Orchidists. During mid-October there are many *Sarcochilus* shows in and around Sydney. This is a great opportunity for growers interested in this enchanting genus to view the very latest developments.

This year also sees our long-term relationship with Australian orchid legend Ray Clement change. Ray has been agenting our seedlings for many years, and is a great enthusiast for our development program. As Ray slows down aspects of his Tinonee Orchid Nursery, we will be launching a limited retailing of our flasks and some seedlings through our website www.barritaorchids.com and our Barrita Orchids, Kulnura Facebook page. This will begin in the early part of 2018.

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Sarcochilus Bunyip 'Apricot'

The *S.* Bunyip grex has already proven to be an outstanding stepping stone in the development of alba poached egg section. 'Apricot' is from a sibling cross of two of the original pink Bunyips. The alba Bunyips will have a profound impact on the full pure colour yellow line.

Sarcochilus Coolendel 'Poached Egg'

From a show bench perspective, this is one of the best in the "Egg style". The upright spike presentation also makes it an excellent parent in our commercial program.

Sarcochilus Kulnura Taser 'WTO'

The presence of white in the warmer colours is, in my opinion, a lifter. It adds an extra dimension to the colour (white tipped orange). It also offers a new line of development, Speckled Orange.

Sarcochilus Kulnura Taser 'Oh My'

What a great colour! This is the orange we were looking for in this cross, solid and vivid. A wonderful example of the full orange section.

Sarcochilus Kulnura Taser

Growing seedlings is one of the best aspects of Orchiding. The anticipation of growing a plant to see its first flower is truly rewarding. The variation in the three *S.* Kulnura Taser shown here is why seedlings bring joy to growers. Each plant is different.

Sarcochilus Kulnura Momentum 'Proud'

Randall Robinson's photography has once again captured the essence of the Barrita *Sarcochilus* program. Lots of upright spikes.

Sarcochilus Kulnura Tipple 'Pinellow'

Quite possibly my favourite flower of the season. The combination of pink, white, orange tinged with yellow is entrancing. While it may never win an award, it is truly beautiful. An aspect of Orchiding that is often over looked by experienced orchid showers.

Sarcochilus Kulnura Mischief 'Dale'

Owned by Randall Robertson. Bred by Scott Barrie. This plant was purchased in bloom at the Barrita Sarc Open Day in 2016. An excellent example of the full yellow section.

Sarcochilus Kulnura Momentum 'Compact'

This plant is super compact. Very tight leaf arrangement. Short, but floriferous stems. This plant has the potential to produce both patterned and red flowers. This could be a very important plant in the potted plant development.

Sarcochilus Kulnura Rosetta 'Picotee Pink'

Sarcochilus really do make a lovely specimen plant. We select parents that produce multiple spikes per growth. This makes for exceptional plants in quite small spaces.

A new subspecies of *Diuris behrii* Schldl. from the highland plains and associated hills east of the Flinders Ranges in South Australia

by David L. Jones and Robert J. Bates

Abstract

Diuris behrii subsp. *multilineata* from dry plains and hills on the inland edge of the wheat belt in the rain-shadow of the higher parts of the Flinders Ranges in South Australia is here described as new. It is compared with the typical subspecies and notes are provided on its distribution, ecology and conservation status.

Key words

Orchidaceae, *Diuris behrii*, new subspecies, *Diuris behrii* subsp. *multilineata*, South Australia, Australian flora.

Introduction

The authors have studied members of the *Diuris behrii* complex in South Australia and the eastern states since the 1970's and have named and described related taxa including *Diuris fucosa* D.L.Jones (2006) from southern New South Wales and *D. inundata* D.L. Jones & R.J. Bates from the lower South-east in South Australia (Jones and Bates 2017). The taxon named here has been known since 1990 according to notes on collections.

Materials and methods

The description was made from live material, the junior author making a Type collection and comparing those flowers with fresh flowers of *Diuris behrii* from the Type location in the Southern Mount Lofty Ranges.

Diuris behrii* subsp. *multilineata
Booleroo, SA
(JN)

Taxonomy

1. ***Diuris behrii*** subsp. ***multilineata*** D.L. Jones & R.J. Bates ***subspecies nov.*** With affinity to *Diuris behrii Schldl.* subsp. *behrii* but differing by its smaller flowers (10-18 mm across *cf.* 30-40 mm across in *D. behrii* subsp. *behrii*) with numerous thin dark parallel lines and striae on the labellum lamina and posterior surface of the dorsal sepal and distinctive brown patterns on the anterior surface of the labellum (absent or with a few short lines in *D. behrii* subsp. *behrii*). The petals of the new subspecies are incurved rather than spreading as in *D. behrii* subsp. *behrii*.

Type: South Australia. Flinders Ranges: old railway corridor north of Orroroo, along disused rail corridor near Eurelia siding, 20 August 2017, *R.J. Bates 96911* (holo CANB, iso AD).

Description: *Tuberous terrestrial herb* growing in small groups. *Leaves* basal 4-8 in a loose tuft, erect, 100-150 mm long, 3-6 mm wide, linear, conduplicate, mid green throughout; base sheathing, apex lax, acute. *Scape* 90-350 mm long, 1.5-2.6 mm thick, flattened one side, slender, green or purple, 1-2-(3)-flowered. *Sterile bracts* 1 or 2, loosely sheathing, lanceolate, 15-25 mm long, 1.5-2.5 mm wide, acuminate, purple tipped. *Fertile bracts* closely sheathing, lanceolate, 10-22 mm long, 5-7 mm wide, shortly acuminate. *Pedicels* 30-50 mm long, c. 1.2 mm diam., terete, mostly within the floral bract. *Ovaries* obovoid, 10-15 mm long, 2-4 mm wide, green. *Flowers* porrect, 10-18 mm across, longer than wide, buttercup yellow with numerous dark brown to purple black narrow lines and striae, lateral sepals pale green. *Dorsal sepal* ovate, obtuse, base gibbous, 8-12 mm long, 5-8 mm wide, the exterior surface darkly coloured at base, this colour extending into numerous purple black narrow parallel lines on the lamina. *Lateral sepals* obliquely deflexed, linear lanceolate, 15-20 mm long, 2-4 mm wide, conduplicate, divergent, apex subacute. *Petals* spreading horizontally, on dark stalks 5-6 mm long; *lamina* narrowly ovate to elliptic, 10-12 mm long, 5-6 mm wide, margins often undulate, apex obtuse. *Labellum* porrect to obliquely decurved, 14-20 mm long, 5-8 mm wide, deeply 3-lobed; lateral lobes thumb-shaped, curved, c. 2 mm long, 1 mm wide, yellow and brown, divergent at right angles from mid-lobe and well separated from it, the outer margins erose; midlobe spathulate, clawed, the claw thick textured, edged dark brown, the lamina ovate, broadest near the base, edged with dark veins, margins minutely crenulate, apex obtuse, exterior surface with a distinctive red brown irregular medial pattern. *Callus* a raised plate smooth near the base, deeper yellow than the lamina, channelled throughout with two erect crests divergent at first then convergent, these crests papillate, terminating just past the middle of the labellum then extending as a smooth low ridge to the apex. *Column* porrect from end of ovary, 3-4 mm long, c 1.3 mm wide. *Column wings* oblong, c. 3 mm long, c. 1.2 mm wide. *Anther* ovate, c. 2 mm wide, purple. *Pollinarium* c. 2.2 mm long, c. 2 mm wide; *pollinia* clavate, c. 2 mm long, white mealy. *Stigma* cordate, c. 3 mm long, c. 2.4 mm wide. *Capsules* obovoid, 15-17 mm long, 5-6 mm wide, green.

Distribution and ecology: Endemic to South Australia where found on the dry plains in the rain shadow area to the east of the higher parts of the Flinders Ranges, growing on the plains themselves and the slopes of the lower ranges from about Laura in the south northward past the edge of the wheat belt into pastoral and semi-arid country as far as east of Wilpena (where not seen since the 1970's). Soils range from red brown earths to clay and gravel, the plants favouring the protection of rocks. Altitude ranges from about 300 metres to 700 metres in the north.

Phenology: This subspecies flowers from about mid-August into September depending on the timing of the seasonal break. This compares with *D. behrii* subsp. *behrii* which has been recorded in late September, October and early November.

Diuris behrii* subsp. *multilineata* - cluster at Booleroo, SA from above *(RB)

Diuris behrii* subsp. *multilineata
Booleroo, SA
(JN)

***Diuris behrii* subsp. *multilineata* - top view showing multiple lines (RB)**

Recognition: Characterised by the comparatively small flowers which are often just half the size of the typical subspecies and the numerous dark lines and brown markings on the flowers.

Similar taxa: *Diuris behrii* subsp. *behrii* has yellow flowers 30-40 mm across, sometimes uniformly yellow but often with a few short lines on the dorsal sepal and exterior of the labellum (plate 100, Bates & Weber (1990, bottom LHS plate, page 126, Jones 2006b). *Diuris fucosa* D.L.Jones is similar but distinguished by its larger pale yellow, semi-erect flowers 30-40 mm across which have a large labellum midlobe usually with prominent stain-like marking near the centre.

Notes: The southern populations of *D. behrii* subsp. *multilineata* grow under drooping sheoak (*Allocasuarina verticillata*) and mixed mallee eucalypts, often in the protection of porcupine grass tussocks (*Trioda* spp.). Further north they grow in grassy steppe with sparse shrubs of *Acacia victoriae* and *Dodonaea* species. This country in the past was much grassier and with a substantial orchid flora. Several associated orchid species have disappeared, some without being named.

By contrast with the habitat of the new taxon, *D. behrii* subsp. *behrii* grows in areas of high and reliable rainfall in grassy woodland dominated by *Eucalyptus camaldulensis* and *Eucalyptus leucoxylon*, with drooping sheoaks sometimes present. *Diuris behrii* subsp. *behrii* also occurs in the Southern Flinders Ranges, but only at high altitudes growing under *Eucalyptus leucoxylon*. The flowers of both subspecies are pollinated by similar species of native bees.

Conservation status: Rapidly declining due to climate drying, grazing and a shrinking habitat. Probably endangered according to the criteria of Briggs & Leigh (1996).

***Diuris behrii* subsp. *multilineata* - another view from above (RB)**

Etymology: The Latin *multus*, many and *lineatus*, lined, in reference to the numerous dark lines and striae on the flowers.

Collections seen at AD (all SOUTH AUSTRALIA - Flinders Ranges region): 6 miles SW of Mt Remarkable near Booleroo Centre in *Allocasuarina verticillata* woodland over *Triodia irritans*, 27 Sept 1990, *P.J Lang* (with D.L. Kraehenbuehl), *AD 99108202*. (identified by R.Bates with a note added "small version of *Diuris behrii*"); 6 miles SW of Booleroo Centre, Sept. 1956, *Cooper s.n.*, AD 97846175 (originally identified as *D behrii* by R Bates); 2 km west of Booleroo Centre late August, Aug. 2017, *R.J. Bates 96945*.

Acknowledgements

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Diuris behrii* subsp. *multilineata – flower from below, showing distinct pattern *(RB)*

Orchid Ailments and Their Management

by Richard Molle

Like any plant, Orchids can suffer from pests, disease and ailments associated with poor cultural conditions. The Orchid-grower must be observant and act when any sign of pests or disease is evident. Priority should always be given to the least toxic, effective option for control of pests and disease. Along with observation and appropriate treatment, preventative measures should be a key component of our cultural practices.

Orchids can be long-lived plants, and fortunately they are largely resistant to pests, however, this does not mean they are invincible! For many of us, the first signs of pests are an infestation, leading us to ask "where did these come from?" The truth is that infestations, no matter how small, do not happen overnight. Vigilance in inspecting your plants is vital to stay on top of pests, as they can very quickly get out of hand. Once you have spotted a pest, the key to controlling it is accurate identification.

Most Orchid pests can be thought of as either sucking or chewing. Among the most common types of sucking pests include: Aphids, Scale, Mealybugs, Thrips and Mites. All of these pests can be controlled using low level measures such as washing or blasting them off with water. Particularly bad infestations will require chemical controls to be applied several times at regular intervals in order to stop the next generation from repeating the cycle. In addition to this, it is often recommended to alternate using different chemicals to avoid the development of resistance in these pests.

Amongst the most ubiquitous of pests are aphids. These small sap-sucking insects are typically found on new, tender growing points. Their piercing mouth parts can be particularly damaging to buds and flowers. Even worse than this, they can be carriers of disease, and transmit virus from plant to plant in your collection. I prefer to squash these bugs, or take the plant outside and hose the aphids off. When detected early, aphids can be prevented from causing any significant damage. A tell-tale sign of aphids is the presence of ants, which feed on the honeydew excrement from the aphids. Alternatively, scale may be present, which also secrete honeydew and attract ants.

Scale are referred to as soft or hard, based on the armoured shell that protects their soft body. This shell must be damaged before the insect beneath can be killed. Scale are commonly found on the underside of Orchid leaves, near the mid vein, leaf axis, or flower stems. If only a few scale are present, my first preference is to physically remove them by rubbing or scratching them off. Alternatively, I soak a cotton bud in isopropyl alcohol (rubbing alcohol) and wipe it across the scale's shell. This should be done slowly and precisely so that the alcohol penetrates the armoured shell of the scale. If larger infestations are evident, then an insecticidal soap or horticultural oil can be used. These aim to suffocate the scale by blocking their breathing pores.

Mealybugs resemble their namesake, appearing as a cottony or mealy mass. Careful observation of your Orchids is needed if mealy bug is to be kept in check, as they typically hide in the crevices of leaves, sheaths and stems, with one type even affecting roots. Their waxy body makes control more difficult, and my first preference is always manual removal. If the infestation is too large, then an isopropyl alcohol soaked cotton bud is used, or a horticultural oil. It is important to isolate badly affected plants in order to prevent their spread throughout your collection. If the roots are affected, then I remove the Orchid from its pot and soak the roots in an insecticidal soap solution for at least two hours before reporting it into a clean pot with new potting material.

Some of the most destructive sucking pests are Thrips. Flower buds, maturing flowers and young leaves are the most commonly affected plant parts. Thrips are too small to be easily seen with the naked eye, but the damage they cause is easy to see, appearing as streaks on flowers and stippling on leaves. Deformed flowers are also evidence of thrips. The best treatment for Thrips is insecticidal soap or horticultural oil. If using these, try to avoid getting them on the roots of your plants, as they can potentially damage them.

Spider mites are actually spiders and not insects. They are commonly prevalent when conditions are hot and dry, and are difficult to identify due their small size. Spider mites will feed on the leaves of your Orchids and cause a stippling effect on the foliage. In extreme infestations, a fine webbing will be evident on the leaves as well. Before it gets this bad, my preference is to wash them off the plant with a strong jet of warm water or use a horticultural oil. Fortunately, the high humidity up in the subtropics makes Spider mites less common than some of the other pests listed above, and this provides a clue for their prevention. Adequate watering and humidity will decrease the incidence of these pests on your Orchids.

The second group of pests are the chewing type, including: slugs, snails, cockroaches and rodents. These pests can cause significant damage to your Orchids in a relatively short period of time. Fortunately, they can all be relatively straight forward to control, with a number of commercially available products to choose from. Before reaching for a poison, think about your pets and the local wildlife. If your orchids are growing in, on or under trees or out in the open, then a non-toxic option should be used. Slugs and snails can be caught and killed in a beer trap, gathered up on a lettuce leaf or on a piece of cut fruit left out the previous night. Traps can be used for other pests and should be checked regularly.

If you are growing your plants in a secured house with no access for pets or wildlife, then poison baits can be used. My preference for snails and slugs is Yates "Baysol" bait, which is fast acting and mould resistant, making it last longer than any other brand I have tried. Mortein's "Kill and Protect" cockroach baits are also long lasting and very effective.

I scatter these throughout my Orchid houses every three months and have not had any trouble for the last few years since using them. Finally, mice can be a problem, especially in the cooler months. To control them I use a combination of traps outside and Talon brand rodent poison inside the growing area away from animals. If I had a pet dog or cat, I would be more cautious about using these baits and poisons, but in my current situation, I find them very useful.

Diagnosing and treating disease is trickier than dealing with insects as only the damage, rather than the pathogen, is seen. The most common types of diseases are caused by bacteria, fungus, or virus. It is also possible that a sick Orchid may be suffering from more than one disease, as a weakened plant is more susceptible to secondary infections. If a disease is found to affect multiple plants, or reappears after treatment, then careful consideration must be made to the culture and conditions being provided to your Orchids. Similarly to the treatment of pests, successful disease treatment first requires accurate identification.

Pseudomonas and *Erwinia* are amongst the most common bacterial diseases affecting Orchids, and can both be fatal. *Pseudomonas* is generally known as crown rot and can spread through the plant rapidly, causing death if not treated. *Erwinia* is associated with soft rot, which typically develops in the leaves of Orchids. Both these bacterial infections need to be treated as soon as they are seen. The first step in treatment should be the removal of all affected tissue. I use a sterile, single-edge razor blade to cut a couple of centimetres below the infection into healthy tissue. I then either cover the exposed tissue with Tomato Dust if small, or drench the plant in Physan and repot if more widespread. In all cases, it is important that the disease be stopped before spreading to the crown of a monopodial Orchid or rhizome of a sympodial Orchid. If the bacteria get into these parts of the plant, they may not be able to recover and you should consider disposing of the plant.

Fungal infections can also affect Orchids. Rusts, smuts and Botrytis commonly affect Orchids grown in conditions without adequate air movement. These pathogens typically appear when temperatures drop, leading to higher humidity. Once flowers are affected, the symptoms are irreversible, but not fatal to the plant. Preventative fungicides like Mancozeb can be used before and during these cold and damp conditions, and the types of fungicide used should be rotated to avoid resistance. My own way of dealing with this for flowering plants is to simply bring them indoors while still in bud. The lower humidity inside the house prevents the infection of these flowers. Hygiene of the growing area is also important to minimising the prevalence of pathogenic fungi, and all old vegetative material should always be removed. If possible, increasing the air movement is the most effective control measure of all.

Perhaps the most insidious of all aliments is virus. Orchid viruses are more common than many growers realise, and can be spread by pests such as aphids as well as the grower if unsterilised equipment is used between plants. Virus may persist in plants without symptoms being evident. Other plants will display patterned necrosis (dead tissue) or streaked chlorosis (yellow tissue) of the leaves, or colour break in flowers. If colour break or any of these symptoms appears in a plant, I suggest you dispose of the plant. If it is a particularly good plant, isolate it and reflower it to determine if the virus persists. Alternatively, you can get the plant virus tested to be sure. The absence of symptoms of virus in plants until they flower or perhaps only in times of stress, mean we should treat all our plants as if they have virus. This means only using sterile tools and pots for every plant to avoid potential cross contamination. I use a supersaturated solution of trisodium phosphate to sterilise all my tools in between use on plants. An alternative would be to flame sterilise your equipment, but a period of time is needed for them to cool down before being used on your Orchids. At this stage, there is no guaranteed cure for virus in Orchids.

Even though Orchids are generally pests and disease free, the Orchid grower needs to be aware of several common ailments and their management for the long-term cultivation of their Orchids. The steps new and experienced growers should follow to control disease are to firstly, discard badly diseased plants. There is little chance you will be able to save it, with the likelihood of it leading to the infection of more of your plants being much higher. Secondly, if you see dark brown or black patches on a plant, remove it with a sterilised tool, along with some of the surrounding healthy tissue. Apply Physan or Hydrogen peroxide (H_2O_2) to any affected plants to further prevent the spread of the disease. Thirdly, isolate any suspected infected plants and treat them as if they were diseased. It is also advisable to quarantine newly purchased plants in case they harbour disease. Lastly, re-evaluate the growing area for adequate air movement and ensure all appropriate disease prevention measures are in place. Always sterilise your tools and pots to ensure you are not the one responsible for spreading disease through your own plants.

(This paper was the 2nd Prize Winner in the *Australian Orchid Foundation* Essay Competition for 2017)

Dendrobium Polka 'Orange Tower'

Softcane Dendrobiums

by Loma and Keith Oxley

General

Softcane Dendrobiums grow high in trees and have a wet/dry season, because they mainly grow in the monsoon area of Northern India, Burma and the slopes of the Himalayas and into the Southeast Asian countries. They are easy to grow and flower if a few basic principles are understood. In addition, the colour range is outstanding and they have an extended flowering period during spring.

Cultivation

Our plants are grown under 30% to 50% shadecloth from October to April which can then be removed to allow as much light on the flowering canes as possible for the winter months. Shade is required during the hot summer days to protect the young developing growths.

They can be hung (for example, from a clothes line) where they can receive maximum light and good air movement. In addition, it prevents flowering plants from falling over because of their tall canes and the small pots they grow in.

Potting

Potting mixture must be free draining and open. Our mixture is as follows:

- 1 part peat moss
- 1 part perlite (medium size)
- 1 part polystyrene
- 2 parts small bark
- 4 parts medium bark

When potting small plants, extra small bark may be added. If larger plants are being potted the mix may be opened up a bit more by adding extra medium bark. Repotting is done as soon as possible after flowering and we believe that two to three years in the same mix is the maximum for good growth. Do not bury the pseudobulbs/canes too deeply in the mixture; the new nodes should be just above the surface of the potting mixture. This is achieved by staking the plant until the new growth takes sufficient root.

Watering

It is important to understand that these plants have a definite growing and rest cycle with the growing period starting after flowering finishes in the spring, usually around the beginning of November, and continuing right through to the early autumn when the canes mature and the terminal leaf is produced.

Never keep plants completely dry in winter, and during the summer months they need copious amounts of water, tapering off by the end of April and increasing again as the weather warms up.

Fertilising

Commence fertilising when new growths are about 5-8 cm long – approximately at the end of October/beginning of November and continue fortnightly until new growths show terminal leaves around the end of April.

We use the following fertilisers in rotation:

- Merrifert NPK 10-13-15
- Campbells Yellow 11-13-16
- Peters Excel 13-2.2-16.5

All the above fertilisers are used at half the recommended strength. It is better to produce compact plants in full flower, so no high nitrogen fertiliser is recommended for flowering size plants. The overuse of high nitrogen fertilisers, especially later in the growing cycle, will result in tall canes that will flower less. Fertiliser can be applied more frequently when plants are making good growth.

Flowering

Light plays an important part in the flowering of Softcane Dendrobiums. When the nodes on the older canes are beginning to swell (usually in July in Sydney, NSW) stake all canes with swollen nodes and move them to the front of the pot and the current season's leafed canes to the back of the pot. This enables the flowering canes to receive maximum light which will maximise flowering along most of the cane. It is important that flowers are staked to support the extra weight of the buds and future flowers, as this adds greatly to the weight of the swollen cane. If the cane is not supported it may bend over at the base and possibly break.

Softcane Dendrobiums in a Shadehouse

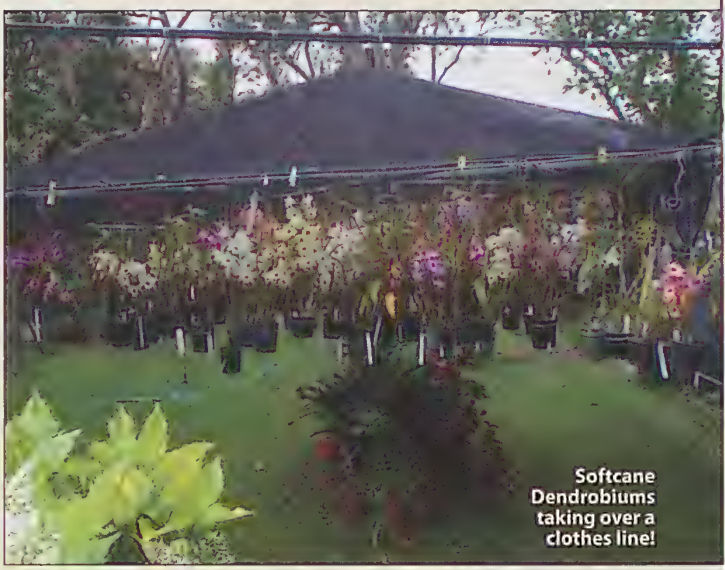
Young plants and keikis/aerials

These require more shade than mature plants and can be given the odd "feed" of higher nitrogen fertiliser through winter on warmer days.

The word keiki is Hawaiian for "baby" or "child", literally "the little one". Keikis (young new plantlets) will sometimes grow in place of flowers and there are a number of causes for this. The main one being that anything which disturbs the root system such as root rot, repotting etc. where keikis will quickly grow roots to replace the lost root system. Other causes of plants growing keikis are too much shade or plants being fertilised at full strength. Keikis can be removed and potted up as individual plants when they produce a good root system. Better still, they can be left for another year on the parent plant until a second growth appears, before being potted up.

Softcane Dendrobiums make a fantastic and rewarding addition to the mixed orchid collection. (All plants grown by the Oxley's, photos by David Banks).

Loma and Keith Oxley
Turramurra, NSW



Softcane Dendrobiums taking over a clothes line!

Flowering Softcane Dendrobiums make a wonderful display, coming in a wide range of modern colours

Dendrobium Turrona 'James'

Dendrobium
Pink Doll
'Elegance'
(grower: Keith Ryan)

36 Orchid Growing Tips

by Eric Collins

Over the years I have received numerous tips on orchid culture from various growers, usually those with much more growing experience than myself. But also some things I have managed to come by from my own experiments and mistakes, and some even from people of pure novice standing. I don't believe it matters much where good information comes from as long as it stands the test of trial. In other words, try it on a couple of expendable plants and if all shows well go from there, bearing in mind that if it is a cultural thing it may need some modification to better suit your conditions. I have always been of the opinion that irrespective who or what a person is, that person can tell me something I don't already know.

So here I'll tell of some of the things I have learnt and found to be of use...

#1 Early in my orchid growing life, I was talking to a more experienced grower one day about the merits of air movement in a glasshouse, and asked his opinion of how much air movement would be too much? His answer was short and direct "As long as it doesn't blow them out of their pots it's not too strong" was his reply. So started a long learning curve which to this day is still continuing and will do so, I hope, for some time yet.

#2 Also on the subject of air movement, at one time we had a chicken pen in the corner of our yard. On doing away with the chooks, we decided the old pen would make a good extra orchid house to take some of the overflow. There was a almost two-metre high paling fence that made two sides along with a frame to take the wire netting on the other two. The small hen house which was just over a metre square became a storage shed for pots etc. So I just placed shadecloth over the lot including the door and so a new shadehouse was created.

Now this shade house was about 8 metres long, 2.5 metres wide and 2 metres high. It had a narrow path down the centre and a knee high bench on either side. Some weeks after plants were transferred; I noticed that those against the fence were not performing well at all, whilst those further from the fence were growing much better. I puzzled on this for a while before the penny dropped; air movement had to be the obvious problem. I removed the offending bench and replaced it with one that sloped from the top rail of the paling fence to the top of the posts that the old bench had sat on. To this sloping sheet of weld mesh I fitted four rows narrow benches in graduated heights to carry the plants. End of growth problem, as the air from the wind neared the fence it rose to go over and in so doing it now passed up through the plants instead of passing well above them. This bench idea proved so good, not only for the growth of plants, but also because it can provide up to 20% more bench space for a given area, I have used it extensively ever since.

#3 Watering is probably one of the simplest parts of culture yet it is the thing that causes most problems. From overuse it would kill more plants than all other causes combined. I have found that by following two simple rules many problems can be avoided.

Rule one... Only water on a rising temperature, in other words if you are thinking your orchids may need watering then first look to the sky, not for guidance but to determine what the weather may be doing. If it is cloudy and dull then forget about water, even if it doesn't rain it won't hurt for your orchids to go a bit longer without water. You may be surprised by just how hardy epiphytic orchids are in this regard.

However if you have now determined that it is to be a fine day then proceed to Rule two.

Rule two... You must now determine if your orchids really do need water or not, lift pots and inspect them. Have a good look at the mix in them to see it is still damp or not, even if you tip a little out onto your hand, be sure. Now the bottom line of rule two, if in doubt, DON'T. If you can't be sure your plants actually need water, then don't give them any, it's that simple. Again, they will be fine for another day.

#4 When considering building an orchid house, quite often a grower will simply build a structure and then fit benches into what they have built. This is alright if room is a premium in the

Young Softcane *Dendrobium* Seedlings

yard space you have and you are limited to size. But if space allows I find it best to first work out the bench sizes and positions you require and then design the orchid house to fit them.

#5 Remember that you are building this house for orchids and maximum bench space is the first priority. All pathways should be kept to a comfortable minimum; after all you probably won't be holding a ball in there. All too often I see orchid houses that contain more path space than bench space or alternatively have paths that you can barely move in because the builder scrimped on them to fit in the required bench space. Always remember that sooner or later you are going to be looking for that little bit more bench space, after all you are an orchid grower.

#6 The golden rule of orchid house construction-- Work out how big you want it, build it twice as big, and it will only be half big enough.

#7 All too often the less experienced grower will come across literature on a particular species that says this orchid grows in an area where there is no rain for six months of the year or something such. If that grower then decides to withhold water for this period of time (books don't lie) within the season stipulated they will find some lessons come hard.
Epiphytic orchids have evolved and developed means to overcome such problems. They have achieved this mainly in two ways, one is to incorporate into their structure some means of water storage, this may be in the form of swollen pseudo bulbs and/or large leathery thick leaves. The other is in how their roots have developed over millennia to have thick outer covering called velamen, this thick spongy covering absorbs moisture from the air very readily even in times when there is seemingly little available. These two modifications work in different ways, the storage method is to store water that the plant has already received when it was more readily available and the velamen covering on the roots can supply moisture from the air from dews and mist in times of low rainfall and so sustain the plant.

#8 Because many of our orchids are grown in pots and possibly in entirely different natural weather conditions, our culture must be such as to compensate these differences. Hence watering throughout the year at differing frequencies and quantities, to suit the individual plant or plants. It would be obvious that orchids, with their adapted velamen covered roots that grow over tree and rock surfaces, would also be able to tap into mists and fogs in the wild.

#9 A grower I knew was in the habit of keeping several pots scattered among his orchids that contained nothing but his potting mix. If he wanted to check whether his plants needed watering he would tip a couple of these pots out, check for moisture and so help to determine if he should water or not.

#10 Over the years I have been asked on a number of occasions by newer growers about indicators that show that a plant is in need of repotting. The most obvious of course is when an orchid has outgrown the pot and new leads are overhanging the sides. Note should be taken also with a plant that has longish rhizomes and whether it might be better served if grown on a mount or even in a wide but shallower pot or saucer. The next main indicator would be when the pot has filled to the point where there is no more room for the next growth or growths.

#11 Care should be taken also to monitor the growing mix and if it is starting to break down and decompose. Action in this case may need to be taken sooner rather than later, regardless of the season. A little harder to pick up on in the early stage is if the roots are starting to die off. This is often the follow on of the previous item and if not corrected in time will result in the orchid itself starting to show signs of stress and wilting. Unfortunately it is not until these signs become apparent that many a novice will realise that there is something wrong.
If the plant in question has reached the point where it is obvious something needs to be done urgently it will possibly be in the best interest to clean it up, trim dead leaves and roots and repot it into a fresh mix. Ensure the plant is securely staked. If the plant has no live roots a small pad of sphagnum moss under it may help encourage new roots to grow.

#12 What time of year to best repot an orchid can sometimes be a perplexing problem to the newer grower, even when that grower has done the rounds of asking others. Some will say to repot in spring, this can be a happy medium as many orchids can be repotted at this time of year with no problem. But I have found our native *Sarcochilus* hybrids prefer to be done in autumn, there would be other genera too. Other growers might say to repot as soon as flowering has finished, again a happy medium but again there can exceptions.
Personally I find the best time to advise others is when new roots are first noticed coming from the base of the plant and before they get too long and damage might be done to them. Using this method can also spread your repotting over a longer period and so lighten the load of doing it all in a shorter time.
It also encourages novice growers to observe their plants closer and maybe pick up on problems that may arise and otherwise be overlooked, such as scale or mealy bug. It is much easier to deal with such problems before they get established.

#13 When observing plants regarding possible repotting in the not too distant future, it is possible with some to make a

Softcane *Dendrobium* – note new growths starting

cut through the rhizome in the position where it would be divided and spray a little fungicide in and on the area cut. This should be done about six months before repotting and when that time comes the grower will possibly have two or more plants in the pot which are separately developing roots and new leads. With some plants it is difficult to find the area to cut so any practice should be performed on those that show obvious places. Cattleyas are one such genus and cuts should be made leaving at least three pseudobulbs in the front section and cut just in front of the next pseudobulb back. Care should be taken of course that all cutting tools are sterilised.

#14 Sometimes when repotting you may end up with some back cuts that have no roots but still show live growth eyes. A method I have found successful in encouraging growth is to get a clear plastic bag of suitable size with no holes, place a small amount of damp sphagnum moss in it then position the back cut on the moss. Now blow the bag full of air and tie the top.

The bag can now be hung in a suitable place out of direct sunlight, under a bench in the orchid house has always been good for me, this is not only suitable but also handy to regularly check for signs of growth. When the new plant is well enough advanced it can be taken from the bag and potted up and placed on the bench. Another way is to pot the back cut into a smallish pot with your usual mix and place a pad of damp moss under it, Stake it with a longer than needed stake and place it in a clear plastic bag. Now tie the top of the bag to the stake to form a tent and again hang it in a suitable place out of direct sunlight.

Neglected *Dendrobium nobile* in serious need of overdue attention!

#15 When potting an orchid care should be taken to stake it well, so the plant can't move in the mix as any movement could adversely affect the growth of new roots. I use bamboo stakes for general potting work however when staking our Softcane Dendrobiums I use aluminium stakes I have made from aluminium powerline off cuts as bamboo will often rot off in the time it takes from staking new canes in late summer to flowering the next spring.

When potting up smaller plants or pieces of back-cuts etc. good use can be made of the bamboo kitchen skewers for stakes. These are available at supermarkets as well as the cheaper stores and are a very inexpensive option, coming in two or three lengths and two diameters.

#16 All stakes used should have sharpened points on the end to be pushed into the pot, not only to make it easier to push them in but also to help reduce the chance of root damage.

#17 White oil is a very effective treatment for a number of pests such as scales, mealy bugs and aphids. A very cheap and grower friendly alternative to commercial products can be made using the following method. Using a suitable size jar or bottle for your immediate requirements, add a good squirt of household washing up detergent and one third fill the container with vegetable cooking oil, I use the cheapest on the supermarket shelf at the time of purchase. Give it a good shake then add about the same amount of water and shake vigorously. Add to your sprayer along with the required amount of water, I use about 20 to 25 millilitres per litre of water, it can be adjusted to better suit different genera.

It is necessary to keep the solution agitated at regular intervals to prevent it settling out but this is a cheap price to pay. This product will wash off the plants quite readily but if it is applied liberally all over and under the plants it will do its job very well. Other pesticides can be added at the time of dilution if deemed necessary and manufacturer's warnings heeded during use.

#18 Sometimes a particular plant may not be growing as well as you would hope, or maybe it has not flowered for you, in such cases a move within the orchid house to a different location, higher, lower or even another place on the same bench can be the answer.

We had a case some years back with a plant of the white flowered form of *Cattleya skinneri* that simply would not flower in its position on the bench among the other cattleyas. On reading how George Skinner first found this particular variety when he saw it flowering on the roof of a village building in South America I went and hung it high on a post just near where it had been on the bench and next season it rewarded me with an average of eight flowers on each flowering pseudobulb. We went on to grow this particular plant with over 250 flowers at one flowering, it still flowers each year for us but on a smaller scale as those large plants are no longer viable for us. An orchid house can contain a number of microclimates and although there may only be minimal differences in some of them it could just make a difference when a plant is moved.

#19 There will possibly come a time when a grower may wish to display or show an orchid or maybe even just dress it up for their own satisfaction. An excellent way to clean the general plant and so enhance its appearance is to mix about 50/50 milk and water, we use warm water to take the chill off the milk, and using a soft cloth gently wipe it over the leaves and pseudobulbs.

This will remove any dust or pesticide residue and leave the plant with a healthy shine unlike cleaning with oil which looks exactly what it is. There is also doubt about the long term use of oils in this way with some saying it can block the stomata in the leaves, these are the tiny openings through which the plant carries out many of its functions. I personally won't be drawn into the debate because I am just not sure.

#20 To provide something on which to hang plants, newer growers will often simply string some fence wire through the orchid house just below the ceiling. While this method will do the job it does have its problems in as much as the plants can often be blown together in strong wind or if the wire is a little on the slack side they gravitate toward the centre and hang in a bunch.
A better alternative is to use barbed wire as the barbs will stop the plants moving and so keep then where they are put. Fair enough, the barbed wire can be difficult to handle but long sleeves and a pair of cheap leather gloves can make it a bit less savage, also a turn buckle will enable you to tighten the wire and so remove any sag. Both of these can be purchased at hardware or produce shops, the wire comes in smaller rolls to suit the handyman. Another alternative is when the orchid house is being built and before the roof material is put in place, cover the roof with wire netting. This will give the grower an infinite hanging space within the house which is not restricted to several straight lines.

#21 It always seems a waste to me to see an orchid in bloom with flowers, pseudobulbs and flower spikes all seemingly going in different directions. Alternatively the grower has gone to the trouble of staking the flowers but only after they have set in their position and when staked they just flop over upside down on in some other undesirable angle.
I believe that if an orchid plant has been cared for and nurtured for twelve months the least a grower can do is start staking it no later than when buds first appear to do it some justice. It is not hard to estimate how long a stake may need to be as the flowers develop or even replace it with a longer one if needed later.
Care should be taken where the stake is longer than the developing spike as eye damage or other injury can occur as the bare stake can be hard to see when bending over inspecting plants. A good idea is to clip a couple of brightly coloured clothes pegs or such to the top of the stake to highlight its position amongst the other plants. When the stake is in place the first tie should be to the pseudobulb or the base of the leaves depending on the particular type of orchid. Alternatively if the stake has to be removed for any reason before the flowers are spent the opposite should apply and the flower tie removed first. This will prevent tension on the young developing flower spike.

#22 When purchasing plants, there is often a number of the same variety to choose from. Always look for one that has a healthy new lead coming away and if any roots are visible see that they are in active growth with green growing tips. These are signs that all is well with the plant and gives you the best start when you get it home. Pick the pot up and check that the plant is firm in the mix as a loose plant will have trouble establishing roots.
At all times keep an eye out for any pests that might be present like scale or mealy bug and that there is no sign of problems in the leaves or pseudobulbs that might be caused from fungal, bacterial or viral infection.


Excellent root system on this Softcane *Dendrobium* (grower: David Banks)

#23 For those of us that are environmentally friendly as well as a little self-preservative, a good safe insecticide can be made by mixing methylated spirits and water at the rate of 50/50 and apply with a 500ml. atomiser. This is an excellent treatment for most common insect pests that we come up against in the orchid house including scale, aphid and mealy bug and is best used for small spotting jobs when pests are first noticed.
We always have an atomiser containing this mix on hand for when a small outbreak is first spotted, this prevents things getting out of hand to where a more damaging and general spray of the whole collection is required. Because it contains no toxic chemical it is not necessary to use protective gear making its use much simpler and it will not harm your plants in any way. The worst that can happen is that you may be a little happier at the finish than when you started from inhaling the overspray!

#24 When preparing for a session of potting in your collection, it is wise to assemble all of the required equipment you might need before starting. This would include pots, potting mix, labels and pencils, stakes, ties, cutting tools and sterilising medium for tools and of course some orchids.
A few years ago I had a bench set up outside our orchid house and used a carry box that contained all of the required equipment with the exception of pots and potting mix. Then my wife saw an ad in a supermarket paper for potting benches and bought me one. Well this bench truly brought my potting into the modern world and after a couple of slight modifications to suit the user, I now have everything at my fingertips including pots and mix all ready to use in an instant on a mobile bench that can be wheeled around to where the work is.


Softcane Dendrobiums hung in shadehouse (grower: Keith Ryan)

There is a frame above the back of the work top with a number of hooks where some equipment can be hung, a hole was cut into the worktop which originally held a shallow metal tray and with a slight enlargement now holds a deep oblong plastic bin. A holder made from PVC tubing holds smaller stakes of various lengths, and a plastic screw-top container holds scissor type cutters in a sterilising solution of Trisodium Orthophosphate (Trisodium Orthophosphate is obtained in a dry powder form and mixed in water to produce a solution which will sterilise any tools soaked in it for a short time killing any pathogen that may be present. Cutters can be left soaking in it indefinitely as it is not corrosive so we have four pair at any time in a plastic screw top jar which we alternate between when potting. There are several ways to sterilise cutting tools but I think this is by far the handiest and causes least problem with tools).

Under the workbench there is a drawer which contains labels, ties and writing gear etc. There is a shelf located low down which holds a large shallow plastic box which had been gathering dust in my shed and fitted perfectly here, this box now contains a number of assorted pots and associated gear. Originally the bench had only two wheels located at one end and required the user to lift the other end to be able wheel the thing around. With slight modification I fitted two sturdy castors under this end and now it can be wheeled and steered to where ever it is needed and with minimal effort.

To finish the whole thing off I then converted an old medium height stool with fold out steps that had been given to me by removing the old top and replacing it with a backed seat. Potting now is a pleasure and with everything set up it is no trouble even if I only have one or two plants to do.

#25 I once read a tip where the writer always placed a second label into the bottom of the pot before potting so that if the original label got lost or faded he could still identify the orchid when he repotted it. After a number of trials with various pens and pencils I have settled on a "B" grade pencil, these are easily found in the shops and do a good job on plastic labels with little to no fading over time.

#26 It has been said that there are as many different orchid potting mixes as there are orchid growers. A slight exaggeration maybe, but many growers do add various ingredients to their mixes and for various reasons. I have tried different additives at times over the years but in hindsight I doubt that many of them ever made much difference.

A number of years ago I conducted an experiment whereby I potted a group of plants of the same clone into different mediums. All plants were the same size and about half grown and the same size and brand pots were used for all. Potting mediums, each used separately included, medium pine bark, 20mm gravel, 6mm gravel, car tyre cut into pieces of about 15mm, smashed windscreen glass, shredded polythene rope, shredded nylon rope, and the current mix I was using at the time, one to each pot. All were then placed side by side on the same shelf in our orchid house and treated the same as the rest of our plants in that house. Over the time of the experiment, all plants experienced a similar growth rate with the one in the shredded nylon rope being the first to flower. I would have liked to have continued on further with the experiment but health dictated that we sell up and move to a smaller property and much of our collection had to be sold as there wouldn't be enough room. The results of the experiment seemed to point out that all orchids need is a medium to support them and a supply of water and fertiliser. I doubt though that the truth is as simple as that but it was an interesting result all the same.

#27 Our current potting medium (2017) is a mix of approximately 60% course perlite, 30% 6mm to 12 mm coconut chip and 10% clean shredded styrene. The perlite and coconut chip is a fairly common mix at present of various percentages and to it we have added the styrene.

There is a fungus that shows up in orchid collections from time to time that manifests itself as a white thread that covers the potting medium completely, this fungus doesn't attack the orchid or harm it directly, instead it soaks up the moisture in the mix and deprives the orchid of water and if nothing is done about it the plant will slowly succumb. Over the years I had seen this fungus from time to time in our collection and simply taken the plant out, cleaned it up and treated it with fungicide and repotted it and because it affected very few plants I didn't worry too much. In those days we used styrene occasionally in our mix but not all of the time.

Then one day when I was repotting it came to me that I had never seen the fungus in a pot that had the styrene added and since then we have always used styrene as part of our mix


Dendrobium Aroona 'Tinonee' (grower: Ray Clement)

and to date I have still not seen it in any of our plants containing this additive.

#28 Often when constructing a glasshouse a grower will cover it with shadecloth to add some shading for the orchids without giving the matter much thought. The main question to answer is do they wish to add the shading and also add or exclude heat? If the shadecloth is added over the top of the glass in spring to add extra shade over the hotter months it may also be desirable to reduce the effects of the summer heat and this is exactly what will happen with the shadecloth outside the glass. If however the shadecloth is placed inside the glass then it won't be as effective in excluding the heat in the same way.
A simple explanation of what happens is that when the rays of sunlight hit an object they heat that object up, this heat is then transferred to the air surrounding the object in exactly the same way the interior of a car is heated when parked in the sun with closed windows.
Now if all is perfect and say 50% shadecloth is used and the cloth is placed outside the glass then 50% of sunlight will go through the cloth and glass and into the glasshouse, the other 50% will strike the cloth and be kept outside and the heat created will be transferred to the open air. If however the cloth is placed inside the glass then all of the sunlight will enter the glasshouse through the glass and the heat of that 50% that strikes the cloth will be retained inside along with the heat from the 50% that passed through. So it can be seen that shading for plants in a glasshouse can have more affect than at first thought and can be also used to a degree for heat control.

#29 Sometimes a newer grower will notice a yellow spot or patch on a leaf, and put it down to being a fungal thing or pass it off as nothing too concerning. A quick glance underneath the leaf will usually reveal the culprit as being a brown scale or even a patch of white woolly scale.
These can be dispatched quickly with a quick spray of appropriate insecticide but what I do is both cheaper and safer for the user. I keep a small 500 ml. atomiser handy which contains a mix of 50/50 metho and water, this is very useful in dealing with a number of insects including aphids, scale, mealy bug, grasshoppers and such and you don't have to reach for the safety gear. The best thing with this system is that if a sharp eye is kept a problem can be dealt with quickly before it spreads and requires a much broader solution.

#30 I was talking to a neurologist one day about the general use of pesticides in an orchid house and I mentioned how I apply them through overhead sprayers using a pump and tank and that way I don't get any spray on myself. That is good she told me, but what about the next day or even days later when you are in there working, the pesticide residue is still on the plants and you are handling them or just brushing past them, you are still picking the spray up that way and that is not good. That was when I looked for alternatives. A thought to ponder.

#31 Blood and Bone is quite a good fertiliser, especially if the grower is looking for an organic product and it is a good fertiliser for top dressing plants and if it can be worked into the top of the growing medium it is even better but overuse can lead to clogging the medium so care should be taken.
It is also excellent to add to potting mix that is just slightly damp so the Blood and Bone will stick to it and not just work its way to the bottom of the container. When used this way it can give the plant a good boost after repotting. The one thing to understand however, is that this product does not contain potassium in its straight form although at least one supplier has started to add it to their product. Personally I prefer to add potassium myself in the form of Potassium Sulphate. Add at the rate of 10% to 15% by volume, I use 15% on orchids and have had good results.

#32 Collecting rain water to supply your orchids needs is in my opinion a good way to go. Many town water supplies contain various chemicals that are not altogether orchid friendly. Even if the majority don't harm orchids they almost certainly won't do them any good. With this in mind and having little room to spare, I set about constructing a system that was not only unobtrusive but also as cheap as possible with the most expensive part being the pump. The storage part of my system had to be something different to a large tank simply because I had little spare room, so after a bit of hunting around I located a couple of 200 litre plastic drums. These drums are used widely these days in a number of different trades but decades ago weren't quite so common.
I purchased a few rubber grommets from an irrigation supplier that were used to fit into poly piping, these came in two sizes, 12mm and 18mm to accept drip irrigation joiners to connect lateral piping in the irrigation industry. I chose 18mm as I thought 12mm a bit small and water delivery would be a bit slow. It was simply a matter of drilling a 22mm hole near the bottom of each drum, fit the grommet and then the poly joiner, both with the aid of a little soap. I used 18mm hose which can be purchased from a hardware supplier and is the same as 12mm garden hose.
It is important that all the drums are on precisely the same level and to set it up the main hose is fitted to the first drum and the rest have a short length of hose fitted with a tee piece on the end. Now just cut the main hose at the first tee and fit, continuing along the line hooking up each drum as you go.
The last two drums in our setup have large lids and are set on blocks to level the tops with the rest, one holds 150 litres and the other 75 litres, and are used to mix fertiliser or anything else I might wish to apply. The hose then continues to the pump and then on to the orchid houses.
To control where the water is being pumped from I have fitted 18mm drip irrigation taps into the system, one before the last two drums to cut off the rest and enable pumping from one of these two and another in the short hose of each of these two to isolate one or the other. If the system is to supply more than one point then these same type of taps can be placed where the delivery hose divides. The pump we use is the smallest pressure pump in the Davey line, these pumps deliver good pressure and should the delivery hose be turned off the pump will cut out. Pressure pumps are designed mainly for rural areas to supply house water from a tank and run at a good constant pressure. Ours has pumped many thousands of litres in the 16 years of service and has never given any trouble.
In our case we have a sloping half A-frame bench on the southern side of our orchid houses and most of our drums are hidden away under it. We have enough to hold about 2000 litres which is sufficient for our needs but more could be fitted if needed, the number would be infinite. All of our watering is done using micro irrigation misting nozzles in overhead pipes.

#33 Since using a mixture of coconut chip and perlite as our basic potting medium, I have had the problem of dust from

the perlite gathering as I get to the bottom of my fifteen litre plastic bin I use to pot from. Sieving is a worry as the dust is very light and floats around meaning wearing a mask to perform this job. Wetting the mix is not the answer as then the dust just clogs the mix inside the pot with the plant in it.

I have solved this problem by using two bins, one inside the other. On the bottom of the inner one I measured a 1cm x 1cm grid and drilled a 4mm hole where each of the lines crossed. This made it into a sieve and when placed back inside the other it allows the dust through as I work which collects in the gap of about 25mm between the bins and can be disposed of safely.


Dendrobium Beetle
- (*Stethopachys formosa*)

#34 For those who wish to make a fertiliser with no nitrogen in it, as we do for our Softcane Dendrobiums during winter, there is a fertiliser called Mono Potassium Phosphate (MPK) which contains 28% Potassium and 23% Phosphorus. We use the one that is marketed by Manutec in small 500gm packs which is a handy size for hobby growers and add the rest of the ingredients we estimate that is needed for our purpose, these being Magnesium Sulphate, Iron Chelate and Trace Elements.

#35 If you have a plant that has become debilitated for whatever reason a good tip to help with its recovery is to get a large bucket of water to which a liberal amount of dissolved sugar has been added and soak the whole plant in it for a while. The sugar will assist the plant to recover but the cause of the trouble in the first place must be addressed to prevent a reoccurrence.

#36 Anyone who has grown Softcane Dendrobiums would be aware of their ability to produce aerials, some more than others. If a plant has more than usual of these growths and they have a good root system straight away there is a good chance that the parent plant has either lost its own roots or they are damaged in some way. This production is a way the plant ensures its survival in a time of stress which, when it occurs in the orchid house, can be caused by a number of things, usually to do with culture. So if plants do produce aerials in excess, the grower should look closely at what they might have done wrong. Has the potting mix been let dry out too long? Has it broken down and clogged the pot? Has the grower used a Nitrogen based fertiliser at the wrong time of year? Whatever the cause, and there are more, steps should be taken to correct it.

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Bunochilus readii, (Orchidaceae: Pterostylidinae), a new rare species from northern New South Wales, Australia

by David L. Jones and Lachlan M. Copeland

Abstract

Bunochilus readii, a new species with affinities to *Bunochilus tenuis*, is described from northern New South Wales, Australia. The species appears to be naturally rare and is apparently restricted to a small area on the upper slopes of Mount Kaputar to the east of Narrabri. Notes are given on its distinguishing features, etymology, distribution, habitat, flowering period, conservation status and potential threats.

Key Words

Orchidaceae, *Bunochilus readii*, *Bunochilus tenuis*, new species, rare, threatened, vulnerable, Australian flora, New South Wales.

Introduction

Bunochilus D.L.Jones & M.A.Clem. is an eastern Australian genus of terrestrial orchids with at least 28 named species and several more undescribed taxa. It is often included within a broadly circumscribed *Pterostylis* R.Br. though we believe it to be a well-defined, distinct monophyletic group worthy of recognition at the level of genus. *Bunochilus* was last revised by Jones (2006) who described 19 new species and erected *Bunochilus* Sect. *Macrosepalae* D.L.Jones to which the new species in the current paper belongs. The existence of a *Bunochilus* species on Mount Kaputar has been known for at least 10 years through observations of sterile leaves, although it wasn't until recently that flowering material could be observed and collected. These flowering plants are most similar to *Bunochilus tenuis* D.L.Jones but are here described as new on the basis of several morphological differences.

Taxonomy

Bunochilus readii D.L.Jones & L.M.Copel., ***sp. nov.*** With affinity to *Bunochilus tenuis* D.L.Jones but differing by its shorter labellum with slightly incurved margins and a less prominent basal mound. It also has affinities with *B. macrosepalus* D.L.Jones but differs by its smaller flowers and a narrower, smooth labellum covered with bead-like siliceous cells over most of the surface.

***Bunochilus readii*, Mt Kaputar, NSW**

Type: New South Wales: Northern Tablelands: Mount Kaputar National Park (precise location withheld for conservation purposes), 11 August 2017, *L.M. Copeland 4539 & M. Read* (holo CANB; iso NE, NSW).

Description: *Rosette* stalk 5-10 mm long; leaves 3–5, ovate-lanceolate, 5–20 mm long, 6–12 mm wide, margins slightly crinkled; petioles 0-6 mm long. *Flowering plants* 15–30 cm tall; stem leaves 4–7, linear-lanceolate, 20–65 mm long, 4–7 mm wide, acute to acuminate. *Flowers* 2–5, porrect to slightly nodding, 15–20 mm long, 8–9 mm wide, translucent pale green with darker green stripes, shiny; sepal tips green to light brown. *Dorsal sepal* 18-20 mm long when flattened, very shallowly curved in profile. *Synsepalum* elliptic, wider than the galea, 14-16 mm long, 8-10 mm wide, shallowly convex, notched (6-7 mm deep); tips parallel or divergent, 4-5 mm apart. *Petals* obliquely oblong-elliptic, 13-15 mm long, 4-4.5 mm wide, narrow at base (c. 1 mm wide), translucent brownish green; anterior margin strongly curved, siliceous; basal flanges vestigial. *Labellum* held well above the lateral sepals and fully exposed when set, yellowish brown to brown with a blackish central stripe and basal mound. *Labellum lamina* oblong when flattened, 5.5–7 mm long, 2.5-3 mm wide, margins incurved, parallel or slightly concave, with a blunt basal mound and incurved apex, surface cells rounded and bead-like, a group of short acicular cells present on and either side of the basal mound; basal mound erect, blunt; lateral lobes relatively large, noticeably concave above the base when the labellum is flattened; midlobe 2-2.5 mm long, sharply tapered, narrowly notched, the lobes acuminate. *Column* 12-14 mm long, curved; wings c. 4 mm long, c. 2.8 mm wide, with a blunt apical lobe 0.3-0.4 mm long. *Anther* c. 2 mm long, erostrate. *Pollinia* oblong, c. 2.5 mm long. *Stigma* oblong-elliptic, c. 6 mm long, c. 2 mm wide. *Capsules* not seen.

Distribution: Currently known only from the upper slopes of Mount Kaputar, approximately 35 km due east of Narrabri in northern New South Wales. Plants occur in at least three subpopulations scattered over a few square kilometres.

Habitat: Grows in layered woodland dominated by Orange Gum (*Eucalyptus prava*) and *Eucalyptus volcanica*, with scattered shrubs of *Exocarpos cupressiformis*, and a relatively dense groundlayer of *Stypandra glauca* and *Rytidosperma pallidum*. Soils are shallow clay loams derived from volcanics, while the altitude ranges from 1100-1200 m.

Flowering: August to September.

Recognition: Characterised by the relatively short (to 30 cm tall)

***Bunochilus readii*, Mt Kaputar, NSW**

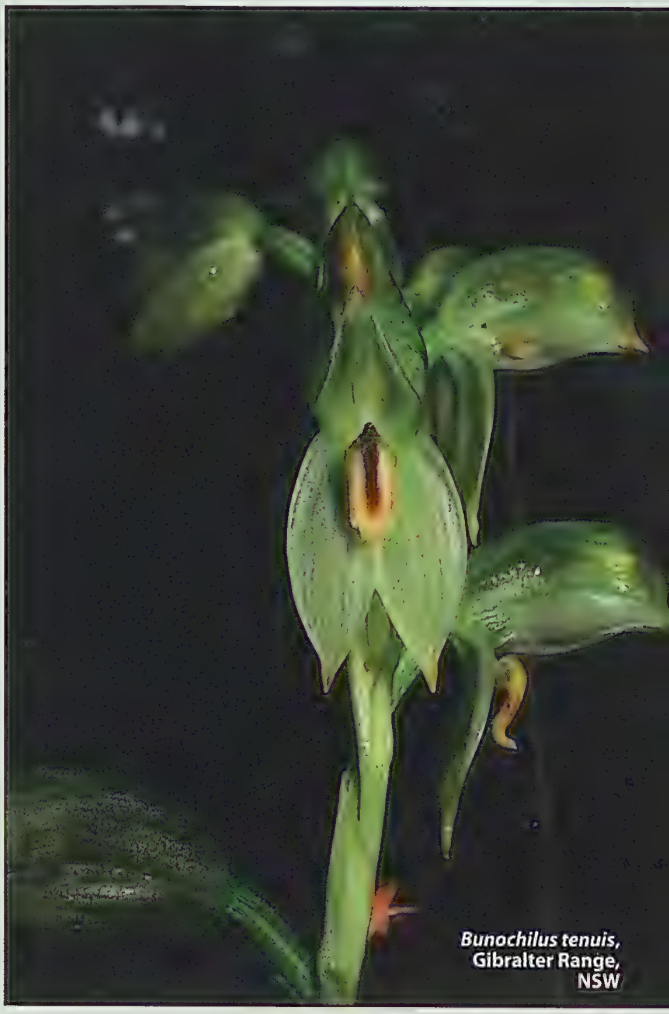
2-5-flowered plants, relatively large shiny flowers (15–20 x 8–9 mm) which are translucent pale green with darker green stripes, elliptical synsepalum broader than the galea, petals with vestigial basal flanges that do not inhibit access to the galea, large (7–8 x 3-3.5 mm) yellowish brown oblong labellum with a blackish central stripe and blunt basal mound, most of the surface covered with beaded siliceous cells, a few long acicular hair-like cells towards the base.

Similar species: This species, part of Section *Macrosepalae*, is similar to *B. tenuis* which differs by its larger ovate synsepalum, longer labellum (two to three times as long as broad, compared to less than twice as long as broad in *B. readii*), more pronounced basal labellum mound, and flat labellum (usually with incurved margins in *B. readii*). On average, plants of *B. tenuis* are also slightly taller and always grow at lower altitudes. *Bunochilus readii* also has similarities with *B. macrosepalus* which has larger flowers and a broader labellum covered with acicular cells over most of the surface.

Etymology: The specific epithet *readii* honours Dr Michael James Read, a veterinarian in nearby Narrabri, who has done much to further our knowledge of the biodiversity in Mount Kaputar National Park, including the orchids, birds and reptiles. Michael was the first to discover the species in flower and assisted in collecting suitable material for further study including the type specimen.

Conservation status: *Bunochilus readii* is currently known from fewer than 100 plants scattered over three subpopulations in a few square kilometres. It is highly likely that additional plants occur, however, given the relatively inaccessible terrain the species favours and the abundance of suitable habitat in the area. Evidence of recent pig activity near the type location suggest that disturbance from feral pigs may be a threat, but otherwise the species appears to be under minimal threat and all known plants occur in a conservation reserve. A ROTAP code of 1VCit following the criteria of Briggs and Leigh (1996) would be appropriate, and we also suggest that it would meet the requirements for listing as 'Vulnerable' under both current state and commonwealth threatened species legislation.


Bunochilus readii, rosette of non-flowering plant, Mt Kaputar, NSW


Bunochilus tenuis, Gibralter Range, NSW

Acknowledgments

We thank Dr Michael Read for assistance in the field and for guiding us to flowering plants in Mount Kaputar National Park. Photos by Lachlan Copeland.

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Acianthus cuneatus, (Orchidaceae), a new species from the Northern Tablelands of New South Wales, Australia

by David L. Jones and Lachlan M. Copeland

Abstract

Acianthus cuneatus, a new species with affinities to *Acianthus apprimus* and *Acianthus fornicatus*, is described from northern New South Wales, Australia. Notes are given on its distinguishing features, etymology, distribution, habitat, flowering period, conservation status and potential threats.

Key Words

Orchidaceae, *Acianthus cuneatus*, *Acianthus apprimus*, *Acianthus fornicatus*, new species, Australian flora, New South Wales.

Introduction

The existence of an undescribed species of *Acianthus* on higher parts of the New South Wales Northern Tablelands has been known for over 20 years and was originally documented by Bishop (1996) under the informal phrase name of "*Acianthus* sp. aff. *fornicatus* (New England)". At the time Bishop (1996) thought it might possibly be restricted to the Armidale and Ebor districts but since then numerous collections and observations have found it to be relatively widespread and common across the Northern Tablelands. We now take the opportunity to formally describe and name this species and to clarify the past confusion between its identity and similarities to two related species of *Acianthus*.

Taxonomy

Acianthus cuneatus D.L.Jones & L.M.Copel., ***sp. nov.*** With affinity to *Acianthus apprimus* D.L.Jones but differing by its porrect rather than nodding flowers, shorter broader lateral sepals with short thick clubs (thin lateral sepals with long thin clubs in *A. apprimus*) and a broader cordate/cuneate labellum with incurved distal margins and a short acutely pointed apex (labellum appearing very narrow in *A. apprimus* due to strongly recurved margins, elliptical when flattened with an extended long-acuminate tip). Also similar to *Acianthus fornicatus* R.Br. but differing by its shorter, thicker clubbed sepals and by having a less densely papillate labellum surface.

Type: New South Wales. Northern Tablelands: Mt Duval, Newholme Field Study Centre, 3 May 1994, *D.L.Jones 12949 & B.E.Jones* (holo CBG 9517101).

***Acianthus cuneatus*, Cathedral Rock National Park, NSW**

Description: Glabrous, tuberous terrestrial *herb* growing in clonal colonies. *Leaf* cordate, increasing in size after flowering, 20-65 mm long, 15-48 mm wide, dark green above, purplish beneath, margins entire, apex apiculate, on a stalk 1-2 cm tall. *Raceme* 5-20 cm tall, slender, pinkish, 1-7-flowered. *Flowers* not crowded, porrect, 7-9 mm long, translucent greenish with purplish stripes and markings, labellum dark purple, callus purple with a green central band. *Floral bracts* broadly ovate, c. 3 mm long, c. 1.6 mm wide, apex long-apiculate to acuminate. *Ovary* linear, 3-3.5 mm long, c. 1 mm across, curved, sparsely verrucose. *Dorsal sepal* hooding the column, ovate to ovate-elliptical, cucullate, 6-8 mm long, 4-5 mm across, translucent greenish, central band and two adjacent veins purplish, dorsal surface near apex papillate; apical club terete, 1-2.5 mm long, thickish, weakly papillate. *Lateral sepals* projected forwards beneath the labellum, the tips often bending back or recurved outwards, 5.5-6.5 mm long, c. 1.3 mm across, narrowly linear-lanceolate, divergent, translucent pinkish with a darker central stripe, distal margins often irregularly undulate; apical clubs linear-terete, c. 1 mm long, papillate. *Petals* porrect to incurved close to the column, ovate-lanceolate, 3.5-4 mm long, c. 1.3 mm across, translucent, sometimes with pink markings, apex acuminate. *Labellum* obliquely decurved, appearing strongly cuneate in the flower but cuneate/cordate when flattened, 5-6 mm long, 3-4 mm across, purple, flat or shallowly concave in proximal half, surface and margins strongly papillate, distal margins incurved; apex acute to apiculate. *Callus* occupying the proximal third of the labellum, cuneate, fleshy, dark purplish red, with a pale transversely rugulose central channel c. 1 mm wide. Basal glands comma-shaped, c. 0.6 mm long, curved. *Column* curved, c. 3 mm long, green or pinkish, widest at base where c. 1 mm across. *Anther* c. 0.6 mm long. *Stigma* c. 0.6 mm across. *Pollinarium* c. 0.7 mm across; viscidium c. 0.2 mm across; pollinia eight, clavate, yellow. *Capsules* not seen.

Distribution: Widely distributed on higher parts of the NSW Northern Tablelands from the Coolah Tops in the south to the Tenterfield district in the north.

Habitat: Grows on slopes and sheltered areas in tall open forest with a grassy understorey. Soils types are mostly brown loams derived from variety of rock types including basalt, granite and metasediments. Altitudes range from 1000-1500 m.

Flowering: February to April.

Recognition: Characterised by the porrect, broad hooding dorsal sepal, broad divergent lateral sepals that curve at the apex and with short relatively

***Acianthus cuneatus*, Mummel Gulf National Park, NSW**

thick apical clubs and a strongly cuneate to cordate/cuneate labellum with incurved distal margins and a short acute apex.

Similar species: Confused with *Acianthus apprimus* which has larger semi-nodding to nodding flowers with a strongly hooded dorsal sepal, long thin parallel lateral sepals with long thin apical clubs and a very narrow labellum with strongly recurved margins and a long drawn-out acuminate apical point. Also similar to *Acianthus fornicatus* and *Acianthus collinus* but easily distinguished by its earlier flowering time (late summer to autumn for *Acianthus cuneatus* and mostly winter for *Acianthus collinus* and *Acianthus fornicatus*) and shorter, thickly clubbed sepals.

Conservation status: Although restricted to the NSW Northern Tablelands, *Acianthus cuneatus* is often locally common and well conserved in numerous reserves such as Coolah Tops National Park (NP), New England NP, Cathedral Rock NP, Mummel Gulf NP, Cottan-Bimbang NP, Oxley Wild Rivers NP, Washpool NP, Ngulin Nature Reserve (NR), Tuggolo Creek NR and Duval NR.

Etymology: The Latin *cuneatus*, wedge-shaped, referring to prominent shape of the labellum.

Selected specimens: NEW SOUTH WALES: Armidale-Grafton Road, 4.2 km NE of t/o to Point Lookout, 14 Apr. 1994, *A.D.Bishop J316/27-36* (CBG 9407999); Beech Lookout, Styx River State Forest, 2 March 1994, *C.Bower sn* (DLJ 12852) CBG 9603767); Barrington Tops Natl. Park, The Rock, Dilgry Circuit, 28 Feb. 1994, *C.Bower* (DLJ 12870) (CBG 9603785); Oxley Wild Rivers Natl. Park, c. 30 km E Walcha, 2 km W of Steepdrop Falls, 4 May 2004, *L.M.Copeland 3743, J.Bruhl & I.Telford* (CANB 584687, NE); New Country Swamp, Mummel Rd, off Enfield Forest Way, 8 Apr. 1997, *D.L.Jones 15137, M.Garratt, N.Cobcroft & P.Metcalfe* (CANB 618127); Mt Duval, 17 Apr. 1995, *P.Metcalfe sn* (DLJ 13918) (CBG 9807178); Oxley Hghy, 60 km E of Walcha, 31 Mar. 1997, *P.Metcalfe sn* (ORG 662) (CANB 650905).

Acknowledgments

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Corunastylis cuspidata, (Orchidaceae), a new species from north-eastern New South Wales and south-eastern Queensland, Australia

by David L. Jones and Lachlan M. Copeland

Abstract

Corunastylis cuspidata, a new species in the *Corunastylis archeri* complex, is described from north-eastern New South Wales and south-eastern Queensland. Notes are given on its distinguishing features, etymology, distribution, habitat, flowering period, conservation status and potential threats.

Key Words

Orchidaceae, *Corunastylis cuspidata*, *Corunastylis archeri*, new species, rare, Australian flora, New South Wales, Queensland.

Introduction

Corunastylis Fitzg. is a genus of terrestrial orchids with over 60 described species and numerous more poorly known taxa awaiting further study and description. A group of similar species informally known as the "*Corunastylis archeri* complex" includes several recently named species from southern NSW and at least three undescribed species from the northern half of that state. This paper describes and names one of these taxa and provides distinguishing features between this new species and other members of the complex occurring in northern NSW.

Taxonomy

Corunastylis cuspidata D.L.Jones & L.M.Copel., ***sp. nov.*** With affinity to *Corunastylis archeri* (J.D.Hook.) D.L.Jones & M.A.Clem., but differing by its taller habit (plants to 300 mm tall with up to 28 flowers *cf.* 100-150 mm tall in *C. archeri* with up to 15 flowers), prominent stripes on the dorsal sepal and petals, longer petals with a drawn-out long-acuminate apex, larger thicker fleshier labellum (4 x 2.5 mm *cf.* 3 x 2 mm in *C. archeri*) with coarsely and densely ciliate margins (finer and relatively sparse in *C. archeri*).

***Corunastylis cuspidata*, West of Ebor (from TYPE location), NSW**

Type: New South Wales: Northern Tablelands: c. 10 km W of Ebor along the road to Guyra, 400 m WNW of Sandy Creek crossing, 27 Nov. 2004, *L.M.Copeland 3858* (holo CANB 599005; iso MEL, NSW, NE).

Description: *Leaf* terete, 150-250 mm long, 1-15 mm wide, dark green; base reddish; lamina sheathing the scape or distally free, subulate, 15-25 mm long, 2-2.5 mm wide, ending 5-25mm below the first flower. *Inflorescence* 200-300 mm tall, bearing 6-28 flowers in a moderately dense spike 18-35 mm long. Floral bracts oblong-obovate, emarginate. *Ovaries* elliptical, c. 2.5 mm long, curved. *Flowers* porrect to semi-deflexed, c. 5.5 mm diam., reddish to dark purple with prominent darker stripes on the dorsal sepal and petals, labellum dark reddish-purple with purple hairs; lateral sepals upcurved. *Dorsal sepal* cucullate, broadly ovate-lanceolate, 5-5.5 mm long, 2.6-3 mm wide, deeply concave; margins entire; apex long-acuminate. *Lateral sepals* narrowly linear-lanceolate, 6-6.5 mm long, c. 1.5 mm wide, not gibbous at the base, widely divergent; distal margins involute; apex subacute. *Petals* widely spreading, ovate-lanceolate, 4-4.5 mm long, c. 1.5 mm wide; margins entire; apex drawn out and long-acuminate. *Labellum* hinged by a short claw, semi-deflexed, not mobile in a breeze. *Labellum lamina* elliptic-obovate to nearly spathulate, 3.5-4 mm long, 2-2.5 mm wide, thick, fleshy, curved throughout, sharply recurved at the apex; margins with short to long (0.3-1 mm long), coarse, spreading, purple cilia; apex apiculate-acuminate. *Labellum callus* oblong-tapered, occupying about two-thirds the area of the ventral surface of the lamina, extending nearly to the labellum apex, dark purplish-black, colluviate, thickest and broadest just above the base then drawn out and tapered to an obtuse apex. *Column* c. 2.7 mm long, c. 1.5 mm wide, whitish to purplish. *Column foot* ligulate, c. 0.5 mm long, the apex incurved. *Column wings* deeply notched; lobes unequal, divergent; posterior lobe much shorter, oblong, paler, obtuse, entire; anterior lobe longer, lanceolate, purplish, attenuate, curved, the anterior margins densely covered with short irregular cilia to c. 0.3 mm long. *Anther* c. 1 mm long, with a filiform rostrum c. 0.5 mm long. *Pollinarium* c. 1.2 mm long; *pollinia* c. 1 mm long, yellow, coarsely granular; *caudicle* c. 1 mm long; *viscidium* c. 0.2 mm wide. *Stigma* ovate-elliptic, c. 1 mm long, c. 0.6 mm wide. *Capsules* not seen.

Distribution: Known from several populations on the NSW Northern Tablelands north from Armidale and extending into southern parts of the Darling Downs (e.g. Stanthorpe district) in south-eastern Queensland.

Habitat: In Queensland *Corunastylis cuspidata* commonly grows in moss gardens developed on granite outcrops, in shallow soil on the margins of rock sheets or in soil pockets in crevices. In New South Wales it usually occurs in slightly deeper soils among grass and shrubs in woodland or open forest, though often still close to rocks. The species appears capable of colonising disturbed soil and is often seen growing beside tracks and on road embankments. Soils include well-drained grey sandy loams and gravelly loams derived from granite or metasediments. Altitudes range from 750 - 1300m.

Flowering: December to March.

Recognition: Characterised by northern distribution, summer-flowering period, tall slender habit, reddish to dark purple prominently striped flowers, large elliptic-obovate to nearly spathulate, thick, fleshy labellum with coarsely ciliate purple hairs and a large, thick colluviate callus.

Similar species: This new species has affinities with *C. archeri* which is short and sturdy compared with the tall slender habit of *C. cuspidata* (*C. archeri* to c. 150 mm tall with a leaf/scape c. 2 mm thick *cf.* 250-300 mm tall and 1-1.5 mm thick in *C. cuspidata*) and fewer-flowered (to 15 flowers *cf.* 28 in *C. cuspidata*). The lateral sepals of *C. archeri* are thinner distally and impart a slender appearance to the flower compared with the thick, chunky appearance of *C. cuspidata*. The labellum of each is distinctive with that of *C. archeri* being ovate-obovate, relatively thin-textured and narrowing distinctly to the base, whereas that of *C. cuspidata* is elliptic-obovate to nearly spathulate, thick and fleshy and does not narrow appreciably towards the base. Additionally the labellum cilia are longer (c. 2.5 mm in *C. cuspidata cf.* 1.5 mm in *C. archeri*) and much coarser and more profuse in *C. cuspidata* compared with *C. archeri*.

Corunastylis cuspidata differs from the three other known members of the *C. archeri* in northern NSW as follows: shorter sepals and less flowers in a more open, organised inflorescence than an undescribed species from Mount Kaputar (i.e. "*Genoplesium* sp. aff. *arrectum* (Mt Kaputar)" as documented by Bishop (1996)); shorter sepals, slightly paler flowers and summer flowering compared to *Corunastylis insignis* from the Lake Macquarie district; and usually more flowers, which are darker-coloured, and in a longer inflorescence than an undescribed species restricted to the Charmhaven district which is currently profiled on the NSW threatened species website as "*Corunastylis* sp. Charmhaven (NSW896673)".

Corunastylis cuspidata, Bolivia Range, NSW

Notes: *Corunastylis archeri* is relatively widespread in Victoria and Tasmania but seems rare in New South Wales where it is known only from the south (e.g. Woomargama, CANB 658277, Deua National Park, CANB 612526 and the Blue Mountains). Six segregate species previously confused with *C. archeri* in New South Wales have been described in recent years (*C. arrecta, C. formosa, C. insignis, C. morina, C. rhyolitica* and *C. stephensonii*), all from southern regions, with the exception of *C. insignis* which occurs north of Sydney.

Conservation Status: Reasonably widespread, often locally common and conserved in several reserves such as Girraween National Park (NP) in Queensland, and Cathedral Rock NP, Bolivia Hill Nature Reserve (NR) and Booroolong NR in NSW.

Etymology: From the Latin *cuspidatus*, pointed, drawing attention to the drawn-out long acuminate points on the petals when compared with those of *Corunastylis archeri*.

Specimens examined: QUEENSLAND: Girraween National Park, rocky hills N of Ranger Station, 5 Feb. 1987, *D.L.Jones s.n. & T.D.Jones* (CANB 526974); private property, The Summit, Jollys Falls, 7 Feb. 1996, *R.Crane 1520* (CBG 9607996); Amiens State Forest, 8 Feb. 1996, *R.Crane 1527* (CBG 9607992); *ibid*, 8 Feb. 1996, *R.Crane 1528* (CBG 9607991); Amiens (private property), 8 Feb. 1996, *R.Crane 1530* (CBG 9708326); near Girraween National Park, 16 March 1997, *M.Mathieson (ORG 638)* (CANB). NEW SOUTH WALES: Bullock Creek, 7 Dec. 1989, *D.L.Jones 5543 & C.H.Broers* (CBG 8914072); Ebor-Guyra road, 11 Jan. 1993, *R.Tunstall (DLJ 11146)*; Boonoo Boonoo, 11 Jan. 1993, *R.Tunstall (DLJ 11150)*; c. 30 km from Armidale along road to Bundarra, 50 m S of crossing of Teatree Creek, 14 March 2005, *L.M.Copeland 3808* (CANB 667014); c. 10 km W of Ebor along road to Guyra, 100 m NE of Biscuit Creek crossing, 4 Dec. 2005, *L.M.Copeland 4022* (CANB 679616, NE, NSW); c. 20 km W of Armidale along road to Bundarra, WSW of Tea Tree creek crossing, 24 Mar. 2007, *L.M.Copeland 4216* (CANB 780041, NE, NSW); c. 10 km NNE of Deepwater along the New England Highway, 1.5 km S of turnoff to Castlecrag Rd, 14 Mar. 2008, *L.M.Copeland 4294* (CANB, NE, NSW).

Acknowledgements

We would like to thank the directors and curators of CANB, NSW and NE herbaria for allowing access to their collections to study specimens of Corunastylis. All photos by Lachlan Copeland.

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Bishop, T. (1996) *Field Guide to the Orchids of New South Wales and Victoria, 2nd edition.* (University of New South Wales Press: Sydney).

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Corunastylis cuspidata, Teatree Creek, near Armidale, NSW

Educating School Children about Orchids

by Alan W. Stephenson

In early August 2017, I received an email from a lady who identified herself as being British but was an exchange teacher from Portugal, where her parents have a farm where she was raised and where her parents still live. She mentioned orchids and conservation and as some would expect I was immediately interested.

The mentioned orchids were on the family farm in Portugal and one in particular had gained her interest. It was *Orchis italica*, although the plant she had photographed was a white albino form, not the normal pink. I did mention this is occasionally one of the differences occasionally posed by orchids. This orchid was not on the farm but at her school in Carcavelos, Lisbon. It grew in a wooded area on the school grounds but is now fenced off for protection.

Christina ran a Nature Club at the school and the children learned about orchids and other things from her. Other orchids on the grounds were the Pyramid Orchid (*Anacamptis pryamidalis*) and the Sawfly Orchid (*Ophrys tenthredinifera*). Unfortunately, that local habitat is now suffering the same development fate as many parts of Australia. She also mentioned she had just begun as an exchange teacher at the nearby Berry Public School. Soon after this she learned of a Threatened Species Day expo for schoolchildren hosted by the Shoalhaven City Council, and her class expressed interest in undertaking a display for this day. The orchid nature interest stemmed from her childhood on the farm, initiated by her mother who found many plants and animals on the farm, and regularly showed then to Christina. There is no doubt the interest in natural things began there.

As luck would have it, one of the students presented her with my personal card which I believe was passed on by a parent, hence the orchid and conservation interest. Following a couple of phone calls and emails from Christina I put together some photos of local endangered orchids, sent them via email and wrote some notes about them. The interest strengthened and on August 23rd I did a presentation to the class for 90 minutes answering the 16 questions they had written. These were, what was the first orchid you saw, what is the rarest orchid known, what is the smallest orchid, the largest orchid, the weirdest orchid and several others along that line.

Exchange Teacher - Christina at Gerroa, August 2017

For this talk I had arranged some A4 laminated photos I had of locally endangered species and a few others and the questions came thick and fast from some very interested children. A few days before the talk I took Christina to nearby seven Mile Beach National Park just a few kilometres away, to show her some orchids in flower *in situ*. Even though they were the common *Pterostylis nutans* and *Pterostylis curta* they were new to her. We even managed to see *Cymbidium suave*, which is not difficult in this area but it was obvious she enjoyed the experience.

The Art teacher at the school was also teaching the class to draw some orchids to assist with the display and some of the drawings were very good for kids of that age. This teacher had also constructed a 3D model of *Rhizanthella slateri* for the display, possibly because it came in as the rarest and weirdest orchid. The end result of these actions was for the class to construct a display for Threatened Species Day.

In the weekend following Christina and I met again for an afternoon of orchid hunting. First to see *Dockrillia linguiformis* and *Dockrillia pugioniformis*, followed by *Sarcochilus falcatus* then to a Rainforest National Park where numerous epiphytic, lithophytic and terrestrial orchids are easily located. These began with *Adelopetalum exiguum* (*Bulbophyllum exiguum*), *Oxysepala shepherdii* (*Bulbophyllum shepherdii*), *Sarcochilus olivaceus*, the rainforest form of the Ironbark Orchid, *Tropilis eburnea* (*Dendrobium aemulum* – rainforest form) plus *Plectorrhiza tridentata*, *Cestichis reflexa* (*Liparis reflexa*), *Dockrillia striolata*, *Pterostylis erecta* flowering in the moss on rocks and another *Cymbidium suave* but this plant was in a rainforest tree.

White form of the Naked Man Orchid *Orchis italica* from Portugal

It was obvious Christina enjoyed the Rainforest as apart from the orchids she was active in photographing some fungi and the newly forming red fronds of several *Blechnum cartilagineum* ferns. Still lots to see as we moved a few kilometres down the road to see the diminutive *Sarcochilus*

hillii (*Sarcochilus minutiflos*) and when back to the Shoalhaven River and the Princes Highway, a look at a rock overhand will provide a view of *Thelychiton speciosus* (*Dendrobium speciosum*), which is almost in the centre of Nowra.

Next came a short trip to the shores of Jervis Bay where *Tropilis aemula* (*Dendrobium aemulum*) was flowering, at its usual height of six metres above ground level but around the tree were several plants of *Bunochilus longifolius* (*Pterostylis longifolia*) and of course another substantial plant of *Cymbidium suave*. Just three kilometres to the end of the road and we were greeted by *Dockrillia teretifolia*, not only high in the trees but at eye level and lower which makes photographing an individual flower quite easy. By this time, it was quite obvious Christina had good orchid vision, as she was able to spot individual terrestrial plants with ease.

Not yet finished we made one last stop just around the corner on the way home to see *Pterostylis baptistii* in bud, *Pterostylis nutans*, *Pterostylis curta*, *Pterostylis pedunculata*, *Petalochilus carneus* (*Caladenia carnea*) and a final *Cymbidium suave* but this time in an Ironbark tree. I am very familiar with all sites visited and know what orchids are on any site and when they will be in flower but it all goes much better with good friendly and enthusiastic company and I appreciate my outings when the company is equally involved and appreciative.

A few days later on September 7th, World Threatened Species Day arrived and I went to the Shoalhaven City Council building (SCC) to look at the displays. I was impressed by what the class had constructed and even more impressed to learn they had won the competition, which consisted of displays of many types from primary classes in the general Nowra and Jervis Bay area. This general area is, apart from being home to 16 threatened orchids, numerous birds, bats, frogs plus a range of sea creatures with most of the latter featured in the displays by schools in the relevant locations.

The Berry display consisted of photos, some of which featured me talking to the class and also drawings of orchids by the class and obviously assisted by the art teacher, who along with the children constructed some 3D images of the underground orchid from the photos I had provided. This was one species which captured the imagination of the class as they tried to come to grips with an orchid which grew underground and managed to emerge just at soil level and produce a flower. *Rhizanthella slateri* featured highly as the weirdest and rarest orchid as far as the class was concerned and another was *Calochilus pulchellus*, the pretty beard orchid as it also is rare being limited to 29 plants, but the colour of the labellum is what gained their attention.

I have never been previously involved in an exercise of this type but it was quite obvious to me the enthusiasm of the class was heightened by the initial interest of the teacher and I was more than pleased to be able to have the ability to provide some written and photographic information and the talk to the class was more interesting than anything I was ever involved with throughout my school days and I would like to think a Botanist, Entomologist or perhaps a good environmental scientist may emerge from what was a primary school class of more than enthusiastic children. ■

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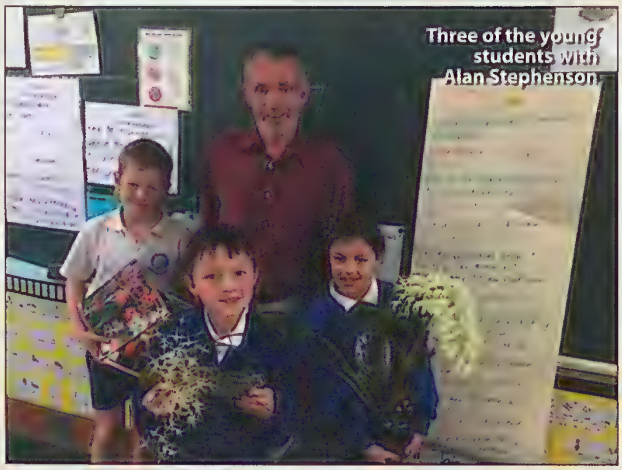

Three of the young students with Alan Stephenson

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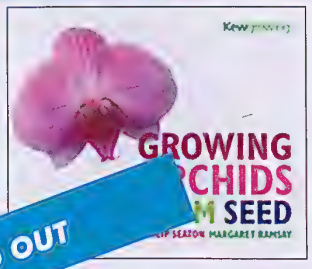

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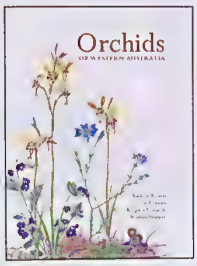

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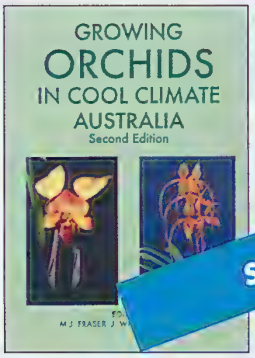

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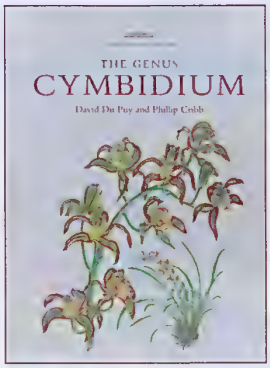

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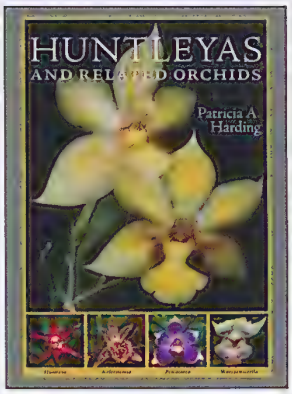

HUNTLEYAS AND RELATED ORCHIDS

by Patricia A. Harding

Revered by avid orchid collectors for its delightful, star-shaped flowers, *Huntleya* is a small group of orchids found low in the forest. *Huntleya* is a small orchid genus that includes fourteen species. They occur in wet cloud forests at medium altitudes of Guatemala, Costa Rica, South America down to Bolivia. The type species *Huntleya meleagris* also occurs in Trinidad. Besides their striking colours — from deep blue to waxy red, royal purple to almost black — flowers of this group are known for their distinctive shapes, patterns, and textures. As appealing as these lovely tropical orchids are, their identification has been confused since the first species was described in the mid-1800s. Recent DNA studies have led to a clearer understanding of relationships and, as a result of this clarity, it is now possible to sort out the taxonomic problems and identify the characteristics that set species apart. In this first book devoted to the *Huntleya* alliance, author Patricia Harding presents evidence from the scientific literature, other growers, and her own experience that will enable orchid enthusiasts everywhere to identify their plants and grow them successfully. Patricia A. Harding is an accredited American Orchid Society judge who has been growing and photographing orchids for three decades.

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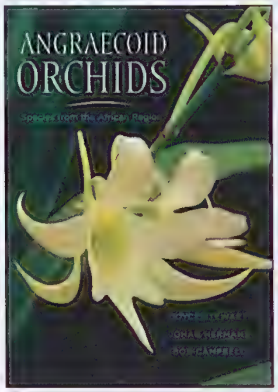

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Species from the African Region

by Joyce Stewart, Johan Hermans, and Bob Campbell

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Cultivation and Hybridisation

by A.F.W. Alcorn

Lycaste orchids are easy to grow, and they produce flowers that range from the beautiful to the bizarre. No book previously has provided detailed cultural requirements of the Lycaste, and this book should fill that gap, and encourage new growers to take up the cultivation of this beautiful genus. A section on hybridising contains valuable information on inheritance and genetics that will benefit any hybridiser, not just the grower of Lycastes, as well as helpful hints on how to avoid pitfalls in your hybridising program. Michael Hallett, a friend of Fred Alcorn for a number of years, co-wrote this book with Fred and has completed it posthumously. He has a background in genetics, research and botany, and a passion for plants, especially orchids.

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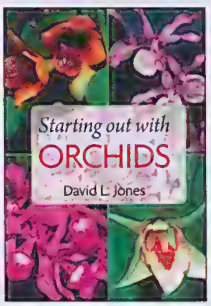

STARTING OUT WITH ORCHIDS

by David L. Jones

David Jones is arguably one of Australia's most prolific, precise and respected botanical and horticultural authors. The book is divided in two parts. Part One begins with the cultivation chapters, covering Easy Orchids for Beginners, General Cultivation Requirements, Growing Epiphytic Orchids, Growing Terrestrial Orchids, Orchid Pests and Diseases, Housing Your Orchids and Propagating Your Orchids. The information contained within these pages alone is required reading for all beginners through to experienced orchid growers. The text is very easy to read and understand with numerous sound cultivation tips and treatments discussed. There are many excellent and clear line illustrations that help describe terms or highlight diagnostic features. There are over 250 colour photographs.

Part Two discusses the orchids themselves with concise information on each species. They are grouped primarily according to climatic requirements, starting with cool growing orchids progressing to the warm growers, in alphabetical sequence first with terrestrial genera, followed by the epiphytes. Both Australian and exotic species are treated together. For each entry there is specific detailed information on each species, as well as a simple table giving the basic cultivation needs and flowering season. A glossary is also included to explain unfamiliar terms.

240 pages, colour. 210mm x 148mm. Softcover.

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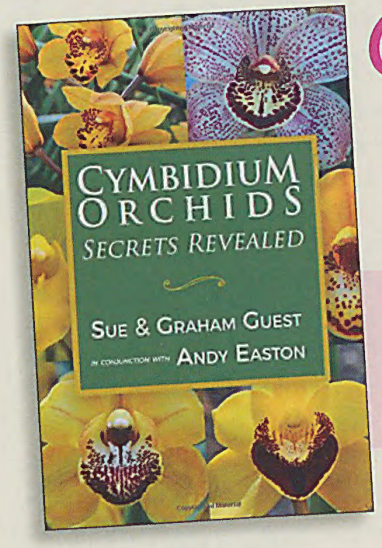

Cymbidium Orchids: Secrets Revealed

by Graham and Sue Guest in conjunction with Andy Easton

Paperback 215mm x 140mm
168 pages (no photographs)
Published: 13 June 2017
ISBN 9781521451700
Also available as digital download through amazon.com

This is a very different kind of orchid book. To quote from Graham & Sue Guest (email: guestorchids@gmail.com):

"This book documents our insights and experiences operating an Australian commercial orchid nursery, Guest Orchids, one of the largest premium pot plant *Cymbidium* nurseries in Australia. After thirty years, we know what works and what doesn't, and it is our pleasure to share this information with you. In addition, our business has enjoyed a long association with Andy Easton, whom we consider the world's premier *Cymbidium* hybridiser. His cutting-edge hybrids have ensured our nursery is at the forefront of new trends and meets the requirements of a discerning market. His knowledge of the genus is unequalled, and it is with great delight he has agreed to contribute to this publication in a major way – dossiers on the major *Cymbidium* species, and the work he has undertaken with them over a 50-year career. Our aim is to share with you cultural and hybridising information we have learnt growing orchids commercially for over 30 years."

There are no photographs, so the reader requires some knowledge of cymbidiums to understand the specific varieties and cultivars under discussion. Firstly, Graham & Sue Guest discuss the basics of *Cymbidium* culture as well as their "Seven Secrets" for success. Andy Easton contributes a number of random topics, in no particular order, discussing many interesting pieces of *Cymbidium* breeding and history. Many of these are informative, whereas some come across as rants. But that's the nature of the guy, he loves polarising people.

I found there is some quite useful information that should please the hardened one-eyed enthusiast, who considers cymbidiums the only true orchids. But I also found it something you would read once and then pass on.

Sadly this book is riddled with countless basic errors in the text. Spell-check obviously wasn't used. Punctuation and use, or lack of, italics is poor. The back cover has three different spellings for the word *Cymbidium*! The page numbers in the contents don't match the actual chapters. There is a serious lack of editing, which makes the book look decidedly "clunky". This is a shame as it detracts from the text. It is printed on cheap paper and of a font and spacing that I found annoying to read, the type often reserved for children's books. It could have been printed on half the number of pages. Maybe the digital version will be edited and updated. Sadly, I think this book would be of very limited interest to a very limited audience.

The authors are champions in the Cymbidium World. They have produced some wonderful orchids over many decades. But I was disappointed with this book, as I expected something far more polished and professional from the three writers combined.

Sarcochilus
Kulnura Passion
'Louanne'
(plant & photo: D.P.Banks)

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